

**MANA: THE SOCIO-CULTURAL FACETS AND SPATIAL
MORPHOLOGY OF TANGALE DOMESTIC SPACES**

JOY JOSHUA MAINA

Thesis submitted to the University of Nottingham
for the degree of Doctor of Philosophy

2013

Abstract

An increase in population recorded in traditional Nigerian communities facing rapid urbanization created a demand for housing. This has necessitated research regarding the socio-cultural needs of different cultures in the country. This gap is most evident the North East region where little or no intense architectural studies have been carried out in part due to mountainous terrain. Furthermore, no culture specific studies have addressed the relationship between social problems such as insecurity, delinquency and slum environments with changes in lifestyle nor investigate the failure of prototype housing in some of these communities.

The present study addresses these issues via two surveys in Tangale land, North East Nigeria. Interdisciplinary approaches combined in ethnography were employed to document the culture and lifestyle of the community for possible relationships between changes in the culture and social problems. Space syntax techniques, scaled drawings and space use patterns were utilized in a measured survey to document and analyse housing in the community. These became instrumental in explaining changes in housing typologies, the sustained use of some socio-cultural values/themes and functional spaces such as courtyards, forecourts for outdoor living as well as spatial and morphological differences between community-produced housing and government-provided prototype units.

Results reveal that changes in the culture of the community largely due to external influences are linked to the observed social problems. Four housing typologies and compound transformation patterns also exist in the study area, correlating with four major historical events. Furthermore, the socio-cultural factors of kinship, security and basic needs were not adequately reflected in the design and location of the prototype units which may account for their abandonment and modification. This has implications for future policies in urban planning and architectural design in Tangale land.

Keywords

Socio-cultural factors

Community housing

Prototype units

Interdisciplinary approaches

Ethnography

Space syntax

Housing typologies

Tangale land

North East Nigeria

Publications and presentations from the research

- Maina, J. J. (2013a) Uncomfortable prototypes: rethinking socio-cultural factors for the design of public housing in Billiri, North East Nigeria. In: *Frontiers of Architectural Research, Elsevier*. Available from: <http://dx.doi.org/10.1016/j.foar.2013.04.004> pp. 1-12
- Maina, J. J. (in press) Constants amidst change: socio-cultural factors influencing house form and residential structure in Tangale land, North East Nigeria. *Journal of the International Society of Vernacular Settlements, ISVS*
- Maina, J. J. (2012a) Framework for the study of socio-cultural factors in Architectural and Urban studies of traditional communities in Nigeria. In: *Proceedings of Designing Place, International Urban Design Conference, 2nd-3rd April, 2012*. Nottingham: Department of Architecture and the Built Environment, University of Nottingham, pp. 368-371.
- Maina, J. J. (2012b) Transformation of traditional community housing in contemporary times: A case study of Tangale land, North-Eastern Nigeria. Paper presented at the 9th AHRA Research Students' Conference *Emerging boundaries of Research Principles & Praxis, 19th-20th May, 2012*. Scott Sutherland School of Architecture, Robert Gordon University, Aberdeen, UK, pp. 1-15.
- Maina, J. J. (2012c). Using Space Syntax methods to explore abandoned prototype housing units in Tangale land, North Eastern Nigeria. In: *Journal of Space Syntax*, Vol. 3 No. 2, pp. 223-227.
- Maina, J. J., Stacey, M. and Samant, S. (2013) Conformity vs Resistance: the changing and constant facets of Tangale domestic architecture, North East Nigeria. Poster presentation prepared for the East Midlands Universities Postgraduate Students' Research Conference, 6th September 2013. University of Derby, UK

Award

Finalist at the Engineering Postgraduate Research Event, Faculty of Engineering, University of Nottingham with the poster titled 'From huts to bungalows: Housing transformation in Tangale land, North Eastern Nigeria'. 16th May 2012, Nottingham, UK

Acknowledgements

It is almost impossible to enumerate all the people who helped in the making of this thesis; most offered assistance out of goodwill and without compulsion, not realising how valuable it was to me.

To my supervisors-Prof. Michael Stacey, Dr Swinal Samant and Prof. Brian Ford who took out time out of busy schedules to offer valuable and constructive criticism, I am grateful. My thanks also goes to Dr Stephen Platt who, though no longer obliged, took out time to go through my initial drafts and ideas on ethnography, offering profound insights into the workings of anthropologists. These were helpful during the fieldwork. The observations and comments made by Dr Ian Cooper and Dr Nicole Porter during the viva were invaluable. I didn't feel examined, I felt supported. This is a better thesis because of that interaction. Thank you very much.

My appreciation also goes to the Education Trust Fund (ETF) for awarding a three-year scholarship towards my doctorate at the University of Nottingham and to the Nigerian Government for financing it. Many thanks to Prof. Kabir Bala, Director Academic Planning and Monitoring, Ahmadu Bello University for facilitating my release from teaching in Zaria and ensuring I received the funds as at when due. Many thanks to my Head of Department, Dr M. D. Ahmed for all the encouragement and support I received during the course of my studies.

Dr J. O. Popoola, you inspired me to the topic and groomed my mind in preparation for the PhD program. I am sincerely grateful. I am also indebted to Dr Raha Ernest for encouraging me to work hard especially in my 1st year and for proof reading early drafts. To Mr S. S. Tulpule, Dr Sani Khalil and Arc. Ibrahim Haruna who took out time to come over all the way to visit in Nottingham, thank you so much.

Rukayyah Bashiru Tukur, you were family in Nottingham, you provided a home away from home. *Allah ya sanya alkhairi da zumunci*. To Bege Laban, thank you for all the encouragement and companionship.

My gratitude goes to Mallam Jerusa and Dr David Maina, my faithful and tireless field assistants without whom most of the measured survey would not have been possible. Phaniel Maina and Yila Bako, thank you for providing original floor plans of the prototype houses and maps of the study area. To Iliya Butte, who was always ready at the drop of a hat to take me wherever I needed to go, nagode. My gratitude also goes to Mr Jonathan Yusuf for kindly granting me access and permission to use the pictures in *Plates 1.1-3*

The support I received from family and friends was invaluable. Linda Garba, Alheri Teku, Rahila Yakubu and Onome Omabele are to be commended. To Mr Jacob Lakam Bara, Apolos Babale and Maiwana, you supported me all the way in my quest to know more of the Tangale culture. *N'faidagu*, thank you. Baba Adamu Ajiji Zela, thank you for the care and prompt attention whenever I needed your valued assistance. *Nagode*.

Finally, I am deeply indebted to my parents, Dr and Mrs Joshua Maina and my brothers, Dr Daniel Maina and Dr David Maina for always believing I could achieve this. You certainly had more faith in me, thank you for the tireless prayers, concern and love. I am forever grateful.

Table of contents

Abstract.....	ii
Keywords.....	iii
Publications and presentations from the research.....	iv
Acknowledgements.....	v
Table of contents.....	vii
List of Figures.....	xvii
List of Tables.....	xxii
List of Plates.....	xxiii
 PART ONE: PREAMBLE.....	 1
1.0 CHAPTER ONE: INTRODUCTION.....	3
1.1 Housing research and vernacular architecture studies in Nigeria.....	3
1.2 The need for culture specific housing and architectural studies in North East Nigeria.....	11
1.3 Tangale land, the study area.....	14
1.4 Aims of the study.....	16
1.5 Objectives of the study.....	16
1.6 Research questions.....	17
1.7 Research hypotheses.....	17
1.8 Scope and delimitations.....	18
1.9 Thesis organization.....	18

2.0 CHAPTER TWO- NIGERIAN VERNACULAR AND DOMESTIC

ARCHITECTURE.....	22
2.1 Early studies in West African vernacular architecture.....	23
2.2 Vernacular studies and documentation of Nigerian traditional architecture.....	25
2.3 Prototype housing in Nigeria.....	34
2.4 Studies on the search and synthesis for a national style....	37
2.5 Regional styles and effects of urbanization.....	40
2.6 Contemporary housing studies on socio-cultural factors, spatial morphology and urban transformation patterns.....	45
2.7 The nature of vernacular architecture studies in Nigeria....	48

3.0 CHAPTER THREE- APPROACHES TO THE STUDY OF

HOUSING AND VERNACULAR ARCHITECTURE.....	52
3.1 Anthropological approaches.....	53
3.1.1 Social organization.....	54
3.1.2 Symbolic approaches.....	55
3.1.3 Social production of built form.....	57
3.2 Behavioural approaches.....	59
3.3 Sociological approaches.....	60
3.4 Techniques employed in anthropological, behavioural and sociological approaches.....	60
3.5 Architectural approaches.....	65
3.6 Space syntax analysis.....	66
3.6.1 Methods of analysis.....	68
a) Justified Permeability Graphs (JPGs).....	68
b) Mean Depth (MD).....	70
c) Relative Asymmetry (RA).....	70

d)	Real Relative Asymmetry (RRA).....	70
e)	Integration Value (IV).....	70
f)	Difference Factor (H^*).....	73
3.6.2	Integration and inference to social life.....	75
3.6.3	Space syntax applications.....	77
3.7	Combining methods from allied disciplines of the built environment.....	80
4.0	CHAPTER FOUR-RESEARCH METHODOLOGY.....	84
4.1	Theoretical and Conceptual Framework.....	84
4.1.1	User lifestyle.....	85
4.1.2	Use of space.....	85
4.1.3	Spatial configuration.....	86
4.1.4	House form and residential structure.....	86
4.1.5	Socio-cultural determinants.....	86
4.2	Methodology and approach.....	88
4.3	Criteria for choosing the sample population.....	91
4.4	Interpretation of results.....	94
PART TWO: RESEARCH FINDINGS.....		96
5.0	CHAPTER FIVE- TANGALE ETHNOGRAPHY.....	98
5.1	The case of architectural ethnography in Tangale land, an introduction.....	98
5.2	Migration from Yemen to the Tangale hills (13 th -14 th Century).....	102
5.2.1	History and settlement of each clan.....	105
a)	Tangaltong.....	113
i)	Biliri.....	113

ii)	Bare.....	114
b)	Tal.....	116
c)	Todi.....	118
d)	Kalmal.....	119
e)	Tanglang.....	122
f)	Banganje.....	124
5.2.2	Traditional and political structure.....	128
a)	Kwaddiyo.....	130
b)	Ponar.....	130
c)	Kwi-Pand-Anamai.....	130
d)	Pobune.....	131
e)	Malkwagam.....	131
f)	Laws of the land.....	132
i)	Murder.....	132
ii)	Oath taking.....	132
iii)	Guinea corn marriage.....	132
iv)	Marriage by exchange of brides.....	133
v)	Stealing farm produce.....	134
vi)	Stealing sheep, goats and other animals.....	134
vii)	Adultery.....	135
viii)	Rape.....	135
ix)	Betrayal.....	135
x)	Straying animals in farmlands.....	135
5.2.3	Farming.....	136
a)	Pasture lands.....	137
b)	Small farmlands.....	138
c)	General farms.....	138
d)	Nearby farmlands.....	139

e)	Far off farms.....	140
f)	Forest reserves.....	140
5.2.4	Gender roles.....	146
a)	Women: household chores and food preparation....	146
b)	Men: provision of food and security, hunting, crafts and attending to clan/family matters.....	151
5.2.5	Marriage and family life.....	152
a)	Marriage.....	152
b)	Childbirth.....	159
5.2.6	Religion and beliefs.....	161
a)	Takme.....	161
b)	Sokomwe.....	162
c)	Yekku.....	163
5.2.7	Feasts, dances, festivals and burial rites.....	165
5.2.8	Language.....	167
5.2.9	Building construction and traditional Tangale architecture.....	169
a)	Building materials and processes.....	173
i)	Assembly and finishes.....	173
ii)	Roofing.....	174
b)	Integral furniture and fixtures.....	177
c)	Services.....	178
5.3	The advent of British Colonials, Islamic traders and Christian missionaries at the turn of the 20 th Century.....	179
5.3.1	Indirect rule and the breakdown of traditional political systems.....	179
5.3.2	Introduction of foreign goods, materials, trade and Islam.....	181

5.3.3	Introduction of Western education, healthcare, rectangular buildings and Christianity.....	181
5.4	Relocation from the Tangale hills to the surrounding plains in 1948.....	183
5.5	Independence and Federalism (1960) to present day.....	185
5.6	Changes in lifestyle, urban migration and the advent of socially related problems.....	186
5.6.1	External influences on the Tangale language.....	187
5.6.2	Dress.....	187
5.6.3	Commerce and infrastructure.....	188
5.6.4	Changes in kinship relations and marriage.....	190
5.7	The architect as an ethnographer, a personal reflection....	196
6.0	CHAPTER SIX: HOUSING IN TANGALE LAND	201
6.1	Architecture as a passive and active agent of change, an introduction.....	201
6.2	Housing transformations and typologies.....	203
6.2.1	Circular huts with thatched conical roofs.....	204
6.2.2	Combination rectilinear rooms and mud huts clad with corrugated iron sheets and thatch.....	205
6.2.3	Rectangular houses and rooms constructed in concrete blocks and clad with corrugated iron sheets.....	226
6.2.4	Freestanding concrete bungalows clad with zinc or aluminium.....	232
6.3	The open courtyard, most integrated space.....	237
6.4	Compound transformations.....	249

6.5	Constancy and change in factors influencing house form and residential structure.....	251
6.5.1	Location of compounds.....	251
6.5.2	Access to compounds.....	252
6.5.3	Compound boundaries.....	253
6.5.4	Spatial organization.....	254
6.5.5	Plan shape.....	254
6.5.6	Types of spaces.....	255
6.5.7	Use of space.....	255
6.5.8	Style/appearance of spaces.....	256
6.6	Socio-cultural factors influencing vernacular house form and residential structure.....	258
6.6.1	Kinship and security in the location and access to compounds.....	258
6.6.2	Basic needs and gender roles in the use of space...	259
6.6.3	Social status in the style/appearance of spaces, housing units and compound walls.....	260
6.7	Conclusions.....	261
6.7.1	Housing typologies: the role of external influences, technology and changing lifestyle in the Tangale community.....	262
6.7.2	Open courtyards: multi functional outdoor living spaces.....	264
6.7.3	Compound transformations according to family size and lifestyle.....	264
6.7.4	Socio-cultural factors: sustained themes through vernacular housing transformations.....	265

7.0 CHAPTER SEVEN: PROTOTYPE HOUSING IN TANGALE LAND	269
7.1 Abandoned and modified prototype housing units in the study area.....	269
7.2 The prototype units.....	271
7.3 Approach and methods for comparing housing in the study area.....	272
7.4 Cultural genotypes from the community sample.....	273
7.5 Syntactic measures and modifications from the prototype units.....	276
7.6 Findings from observed activities and patterns of space use.....	280
7.7 Implications of findings.....	282
7.7.1 Kinship and security considerations for compounds.....	282
7.7.2 Basic needs and functional spaces: courtyards and verandas.....	283
7.7.3 Flexibility for bedrooms and sleeping spaces.....	284
7.8 Linking theory to practice, implications for urban planning and architectural design.....	284
7.8.1 Location of residential units in occupied clan lands...	285
7.8.2 Basic design considerations and spatial requirements.....	286
PART THREE: CONCLUSIONS	289
8.0 CHAPTER EIGHT: CONCLUSIONS, RECOMMENDATIONS, AREAS FOR FURTHER RESEARCH	291
8.1 Summary of key findings.....	291
8.2 Reflections on the methodology and fieldwork.....	295

8.2.1	Limited time frame for an extensive study.....	296
8.2.2	Insecurity and insurgency in the North East region..	296
8.2.3	Inadequate formal training in interdisciplinary approaches.....	297
8.2.4	Space syntax software programmed along western standards of space use.....	298
8.3	Towards a cultural anthropology of architecture, a revised framework for vernacular studies.....	301
8.4	Conclusions.....	304
8.5	Recommendations.....	305
8.5.1	Incorporating interdisciplinary methods in the curriculum for Nigerian schools of architecture.....	306
8.5.2	Design recommendations for future urban planning and architectural design.....	306
8.5.3	Broader contextual issues: reviving traditional skills and values.....	309
8.5.4	Improvement for space syntax software for analysis of non-western configurations.....	311
8.6	Original contributions of the study to the body of knowledge.....	311
8.7	Areas for further research.....	312
8.7.1	Testing the framework in other clans of the community.....	312
8.7.2	Need for similar research in surrounding cultures of North East Nigeria.....	312
8.7.3	Need for an archaeological study of the Tangale hills	312
8.7.4	Need for Environmental research and analyses in the study area.....	314

List of Figures

Figure 1.1	Map of Nigeria showing positions of cultures in the text.....	8
Figure 1.2	Topography of Nigeria.....	8
Figure 1.3	Traditional Marghi dwelling.....	9
Figure 1.4	Section A-A, traditional Marghi dwelling.....	9
Figure 1.5	Traditional Burra dwelling, a compound on the Biu Plateau.....	9
Figure 1.6	Section through man's apartment.....	9
Figure 1.7	Floor plans of a traditional Higgi dwelling, Mandara highlands.....	10
Figure 1.8	Section A-A, traditional Higgi architecture.....	10
Figure 1.9	Elevations, traditional Higgi architecture.....	10
Figure 1.10	Location of Tangale land in North East Nigeria.....	13
Figure 1.11	Thesis organization.....	20
Figure 2.1	Framework for the study of African and Nigerian vernacular architecture.....	22
Figure 2.2	Hausa vaults.....	24
Figure 2.3	Plan of a family compound, Ile-Ife.....	26
Figure 2.4	Circular plan of a Yoruba city, Owo.....	27
Figure 2.5	Isometric cut out of Chief Eson's palace in Benin, South East Nigeria.....	31
Figure 2.6	Floor plan of Chief Eson's palace in Benin, South East Nigeria.....	31
Figure 2.7	Section B-B , Chief Eson's palace, Benin.....	31
Figure 2.8	Floor plan of a Yoruba palace, South West Nigeria.....	32
Figure 2.9	Mbari house, Igbo land, South East Nigeria: Isometric cut-out.....	32
Figure 2.10	Isometric cut-out, Massallacin Jumma'a, Zaria, North West Nigeria.....	33
Figure 2.11	Isometric cut-out, Jaba dwelling, North Central Nigeria.....	33
Figure 2.12	Floor plan, Jaba dwelling, North Central Nigeria.....	33
Figure 2.13	Section B-B, Jaba dwelling, North Central Nigeria.....	33
Figure 2.14	Section C-C, Jaba dwelling, North Central Nigeria.....	33
Figure 2.15	A two-bedroom prototype house plan used by a private developer for mass housing.....	36
Figure 2.16	Option 2 for a two-bedroom prototype house plan used by a private developer for mass housing.....	36
Figure 2.17	Styles and trends in Nigerian vernacular architecture.....	38
Figure 2.18	Steps in breakdown of Efik traditional compounds.....	43
Figure 2.19	Stage 2-beginning of breakdown at the perimeter.....	43
Figure 2.20	Final stage-compound no longer exists.....	43
Figure 2.21	Traditional Gbagyi compound.....	48
Figure 3.1	Framework for vernacular architecture studies.....	53
Figure 3.2	Space is an intrinsic aspect of activity and not just a background for it.....	68
Figure 3.3	House X.....	69
Figure 3.4	Importing the layout into Depthmap.....	71
Figure 3.5	Creating, linking and analysing convex maps.....	72
Figure 3.6	Computing integration values.....	72

Figure 3.7	<i>Computing other syntactic data (RA, RRA etc)</i>	73
Figure 3.8	<i>Layout of a farmhouse showing different configurations and integration values depending on the space one is viewing the whole complex from</i>	75
Figure 3.9	<i>Relationship between the tangible and intangible elements in socio-cultural housing studies</i>	76
Figure 4.1	<i>Theoretical and conceptual framework</i>	87
Figure 4.2	<i>2nd survey sample size selection process</i>	91
Figure 4.3	<i>Tangale community set up</i>	92
Figure 4.4	<i>Relationship between surveys and interpretation of results</i>	94
Figure 5.1	<i>Timeline illustrating four main events in the history of the Tangale community</i>	101
Figure 5.2	<i>Location of Marib and the region of the Sabeen civilization in relation to the present day Yemeni capital, Sana'a</i>	104
Figure 5.3	<i>Reconstructed map of West Africa and the Middle East showing the stages of relocation of the Tangale people</i>	105
Figure 5.4	<i>Map of initial Tangale hill settlements showing the areas occupied by each of the clans</i>	109
Figure 5.5	<i>Map of Nigeria showing the extents of the Kwarrafa kingdom</i>	122
Figure 5.6	<i>Extents of Tangale kingdom, towns and settlements in Gombe division</i>	126
Figure 5.7	<i>Schematic diagram of Tangale administrative structure in Pre-colonial times</i>	128
Figure 5.8	<i>Schematic diagram of Tangale judicial system in the Pre-colonial era</i>	131
Figure 5.9	<i>Climatic data of the study area</i>	137
Figure 5.10	<i>Schematic arrangement of traditional Tangale compounds</i>	147
Figure 5.11	<i>Traditional Tangale marriage, 1st stage: Household formation</i>	158
Figure 5.12	<i>2nd stage: Family grows</i>	158
Figure 5.13	<i>3rd stage: Family extends</i>	158
Figure 5.14	<i>4th stage: Death of compound head, formation of new compounds by his descendants</i>	159
Figure 5.15	<i>Hut construction of stones</i>	172
Figure 5.16	<i>Schematic diagram of Tangale administrative system during the Colonial era</i>	180
Figure 5.17	<i>Schematic diagram of Tangale judicial system in the Colonial era</i>	181
Figure 5.18	<i>Relocation to the Tangale hills to the surrounding plains</i>	184
Figure 5.19	<i>Linear network of roads in Billiri</i>	185
Figure 5.20	<i>Schematic diagram of Tangale administrative and political set-up presently</i>	186
Figure 5.21	<i>Modern day households, 1st stage</i>	190
Figure 5.22	<i>2nd stage</i>	191
Figure 5.23	<i>3rd stage</i>	191
Figure 5.24	<i>4th stage</i>	191
Figure 6.1	<i>Compound 1</i>	204
Figure 6.2	<i>Compound 2</i>	208
Figure 6.3	<i>Compound 3</i>	208
Figure 6.4	<i>Compound 4</i>	208

Figure 6.5	<i>Compound 5</i>	209
Figure 6.6	<i>Compound 6</i>	209
Figure 6.7	<i>Compound 7</i>	210
Figure 6.8	<i>Compound 8</i>	210
Figure 6.9	<i>Compound 9</i>	211
Figure 6.10	<i>Compound 10</i>	211
Figure 6.11	<i>Compound 11</i>	211
Figure 6.12	<i>Compound 12</i>	212
Figure 6.13	<i>Compound 13</i>	212
Figure 6.14	<i>Compound 14</i>	212
Figure 6.15	<i>Compound 15</i>	213
Figure 6.16	<i>Compound 16</i>	213
Figure 6.17	<i>Compound 17</i>	214
Figure 6.18	<i>Compound 18</i>	215
Figure 6.19	<i>Compound 19</i>	216
Figure 6.20	<i>Compound 20</i>	217
Figure 6.21	<i>Compound 21</i>	217
Figure 6.22	<i>Compound 22</i>	218
Figure 6.23	<i>Compound 23</i>	218
Figure 6.24	<i>Compound 24</i>	219
Figure 6.25	<i>Compound 25</i>	220
Figure 6.26	<i>Compound 26</i>	220
Figure 6.27	<i>Compound 27</i>	221
Figure 6.28	<i>Compound 28</i>	221
Figure 6.29	<i>Compound 29</i>	222
Figure 6.30	<i>Compound 30</i>	223
Figure 6.31	<i>Compound 31</i>	223
Figure 6.32	<i>Compound 32</i>	224
Figure 6.33	<i>Compound 33</i>	225
Figure 6.34	<i>Compound 34</i>	225
Figure 6.35	<i>Compound 35</i>	227
Figure 6.36	<i>Compound 36</i>	228
Figure 6.37	<i>Compound 37</i>	229
Figure 6.38	<i>Compound 38</i>	230
Figure 6.39	<i>Compound 39</i>	231
Figure 6.40	<i>Compound 40</i>	231
Figure 6.41	<i>Compound 41</i>	234
Figure 6.42	<i>Compound 42</i>	235
Figure 6.43	<i>Compound 43</i>	235
Figure 6.44	<i>Compound 44</i>	236
Figure 6.45	<i>Compound 45</i>	236
Figure 6.46	<i>Convex map, JPG Compound 1</i>	238
Figure 6.47	<i>Convex map, JPG Compound 2</i>	238
Figure 6.48	<i>Convex map, JPG Compound 3</i>	238
Figure 6.49	<i>Convex map, JPG Compound 4</i>	238
Figure 6.50	<i>Convex map, JPG Compound 5</i>	238
Figure 6.51	<i>Convex map, JPG Compound 6</i>	238

Figure 6.52	<i>Convex map, JPG Compound 7</i>	239
Figure 6.53	<i>Convex map, JPG Compound 8</i>	239
Figure 6.54	<i>Convex map, JPG Compound 9</i>	239
Figure 6.55	<i>Convex map, JPG Compound 10</i>	239
Figure 6.56	<i>Convex map, JPG Compound 11</i>	239
Figure 6.57	<i>Convex map, JPG Compound 12</i>	239
Figure 6.58	<i>Convex map, JPG Compound 13</i>	239
Figure 6.59	<i>Convex map, JPG Compound 14</i>	240
Figure 6.60	<i>Convex map, JPG Compound 15</i>	240
Figure 6.61	<i>Convex map, JPG Compound 16</i>	240
Figure 6.62	<i>Convex map, JPG Compound 17</i>	240
Figure 6.63	<i>Convex map, JPG Compound 18</i>	241
Figure 6.64	<i>Convex map, JPG Compound 19</i>	241
Figure 6.65	<i>Convex map, JPG Compound 20</i>	241
Figure 6.66	<i>Convex map, JPG Compound 21</i>	242
Figure 6.67	<i>Convex map, JPG Compound 22</i>	242
Figure 6.68	<i>Convex map, JPG Compound 23</i>	242
Figure 6.69	<i>Convex map, JPG Compound 24</i>	242
Figure 6.70	<i>Convex map, JPG Compound 25</i>	243
Figure 6.71	<i>Convex map, JPG Compound 26</i>	243
Figure 6.72	<i>Convex map, JPG Compound 27</i>	243
Figure 6.73	<i>Convex map, JPG Compound 28</i>	243
Figure 6.74	<i>Convex map, JPG Compound 29</i>	244
Figure 6.75	<i>Convex map, JPG Compound 30</i>	244
Figure 6.76	<i>Convex map, JPG Compound 31</i>	244
Figure 6.77	<i>Convex map, JPG Compound 32</i>	244
Figure 6.78	<i>Convex map, JPG Compound 33</i>	245
Figure 6.79	<i>Convex map, JPG Compound 34</i>	245
Figure 6.80	<i>Convex map, JPG Compound 35</i>	245
Figure 6.81	<i>Convex map, JPG Compound 36</i>	245
Figure 6.82	<i>Convex map, JPG Compound 37</i>	246
Figure 6.83	<i>Convex map, JPG Compound 38</i>	246
Figure 6.84	<i>Convex map, JPG Compound 39</i>	247
Figure 6.85	<i>Convex map, JPG Compound 40</i>	247
Figure 6.86	<i>Convex map, JPG Compound 41</i>	247
Figure 6.87	<i>Convex map, JPG Compound 42</i>	248
Figure 6.88	<i>Convex map, JPG Compound 43</i>	248
Figure 6.89	<i>Convex map, JPG Compound 44</i>	248
Figure 6.90	<i>Convex map, JPG Compound 45</i>	248
Figure 6.91	<i>Compound 46, future trends</i>	250
Figure 6.92	<i>Kinship, location of compound and its relationship to the community</i>	252
Figure 6.93	<i>Insecurity and other related preferences for least liked areas</i>	252
Figure 6.94	<i>Neighborliness, kinship and social relations</i>	252
Figure 6.95	<i>Basic needs, gender roles and use of space</i>	256
Figure 6.96	<i>Social status related preferences from the surveyed compounds</i>	257
Figure 6.97	<i>Income of households</i>	257

Figure 7.1	<i>Prototype I</i>	277
Figure 7.2	<i>Prototype II</i>	279
Figure 7.3	<i>Prototype II mod</i>	279
Figure 7.4	<i>Activities and space use for compounds and prototype units</i>	281
Figure 7.5	<i>Activities observed within functional spaces for compounds</i>	282
Figure 7.6	<i>Activities observed within functional spaces, Pro II mod</i>	282
Figure 7.7	<i>Convex map of Compound 42 with dotted lines showing link between high IV spaces (Sr, Dr), the veranda and courtyard</i>	286
Figure 7.8	<i>Convex map of Compound 44 with dotted lines showing link between high IV space (Co), the veranda and courtyard</i>	286
Figure 8.1	<i>Depthmap v 10 analysis showing no break in the courtyard convex space</i>	299
Figure 8.2	<i>Depthmap v 10 analysis showing a break in the courtyard convex space</i>	299
Figure 8.3	<i>Revised framework for vernacular architecture studies</i>	302

List of Tables

Table 3.1	<i>Space Syntax values, House X.....</i>	71
Table 3.2	<i>H* values, step depth and space link ratio, House X.....</i>	74
Table 5.1	<i>Activities in Tangale land delineated according to seasons and gender roles.....</i>	145
Table 5.2	<i>Main historical events, community reaction and changes in lifestyle and culture.....</i>	187
Table 5.3	<i>Hospitals and clinics in the study area.....</i>	189
Table 5.4	<i>Primary and Secondary schools in the study area.....</i>	190
Table 6.1	<i>Relationship between main historical events and housing typologies.....</i>	203
Table 6.2	<i>Most integrating spaces in the community sample.....</i>	237
Table 6.3	<i>Functions and their integration values in the community.....</i>	237
Table 6.4	<i>Compound transformation and spatial character.....</i>	249
Table 6.5	<i>Summary of constants and changes in factors influencing house form and residential structure.....</i>	258
Table 7.1	<i>Basic syntactic data, community sample.....</i>	274
Table 7.2	<i>Average integration values for all spaces in the community and prototype sample.....</i>	277
Table 7.3	<i>Changes and modifications by occupants of Pro II mod.....</i>	280
Table 7.4	<i>Summary of activities and corresponding IVs for compounds and units.....</i>	280
Table 8.1	<i>SWOT analysis combining methodologies from four disciplines in the study area.....</i>	300
Table 8.2	<i>Line of best fit for estimating plot sizes from surveyed compounds.....</i>	308

List of Plates

Plate 1.1	<i>View of the A345i</i>	8
Plate 1.2	<i>View of the A345ii</i>	8
Plate 1.3	<i>Outcrop of rocks along the A345</i>	8
Plate 1.4	<i>Part of the Tangale hill range seen from the surrounding plains</i>	15
Plate 1.5	<i>View of a settlement seen from the hills</i>	15
Plate 1.6	<i>Main street passing through all Tangale towns</i>	15
Plate 1.7	<i>A footpath in Billiri</i>	15
Plate 2.1	<i>The great mosque in Djenne</i>	24
Plate 2.2	<i>Tallensi compound, Northern Ghana</i>	24
Plate 2.3	<i>Classic Djenne facade with its flanking quoins</i>	24
Plate 2.4	<i>Front elevation of the compound in Figure 2.3</i>	26
Plate 2.5	<i>Hausa house</i>	29
Plate 2.6	<i>Hausa decorated façade</i>	29
Plate 2.7	<i>Typical village setting in Northern Nigeria</i>	29
Plate 2.8	<i>Magina, local Hausa builders at work with sundried earth bricks found in most parts of Northern Nigeria</i>	29
Plate 2.9	<i>Aerial view of mass houses in Urban cities of Nigeria for government workers</i>	36
Plate 2.10	<i>CAD generated view of a duplex for construction by private developers in designated estates</i>	36
Plate 2.11	<i>Brazilian influences on vernacular buildings-Ibadan</i>	39
Plate 2.12	<i>Afro-Brazilian two-storey rooming house, Ile-Ife</i>	39
Plate 2.13	<i>Chancellor's lodge, F.U.T. Akure, vernacular traditions in modern buildings</i>	39
Plate 2.14	<i>Brazilian influences on vernacular buildings-Akure</i>	39
Plate 2.15	<i>Igbo traditional house</i>	42
Plate 2.16	<i>Igbo vernacular house</i>	42
Plate 2.17	<i>Mbari Igbo shrine</i>	42
Plate 2.18	<i>Holy Ghost Cathedral, Enugu</i>	42
Plate 2.19	<i>Entrance porch, Emir's Palace, Kano</i>	47
Plate 2.20	<i>Kofar Na'isa, Kano</i>	47
Plate 2.21	<i>A contemporary house common in the FCT Abuja and other urban cities in Nigeria</i>	48
Plate 4.1	<i>Position of Tangale towns</i>	93
Plate 4.2	<i>Closer view of Biliri, Bare and Komta where the sample population resides</i>	93
Plate 5.1	<i>Farmland around Tangale settlements</i>	112
Plate 5.2	<i>Typical Tangale settlement: Billiri from Pandikungu on laterite road</i>	112
Plate 5.3	<i>Typical Tangale town: Pandikungu</i>	112
Plate 5.4	<i>Typical Tangale town: Komta</i>	112
Plate 5.5	<i>Galadima's Palace, Bare</i>	116
Plate 5.6	<i>A street in Begle area, Bare</i>	116
Plate 5.7	<i>Pand Bore</i>	118
Plate 5.8	<i>Pand Bore seen from Tal</i>	118
Plate 5.9	<i>Leaves of the red sorrel plant</i>	138

Plate 5.10	<i>Okra plant</i>	138
Plate 5.11	<i>Groundnuts</i>	139
Plate 5.12	<i>Beniseed</i>	139
Plate 5.13	<i>Red guinea corn</i>	139
Plate 5.14	<i>White guinea corn</i>	139
Plate 5.15	<i>Baobab tree</i>	141
Plate 5.16	<i>Open pods and seeds of the Baobab tree</i>	141
Plate 5.17	<i>Millet</i>	141
Plate 5.18	<i>Tamarind tree</i>	141
Plate 5.19	<i>Beans</i>	143
Plate 5.20	<i>Beans still fresh in their pods</i>	143
Plate 5.21	<i>Pumpkins</i>	143
Plate 5.22	<i>Bambranuts</i>	143
Plate 5.23	<i>Jute leaves</i>	143
Plate 5.24	<i>Leaves of a moringa tree</i>	143
Plate 5.25	<i>Prepared guinea corn, ready for the mill</i>	145
Plate 5.26	<i>Local condiment</i>	145
Plate 5.27	<i>Robit</i>	148
Plate 5.28	<i>Cooking area in a compound</i>	148
Plate 5.29	<i>A woman preparing food for the evening meal using a mortar and pestle</i>	148
Plate 5.30	<i>A young girl grinding beniseed using the traditional hand stone mill</i>	148
Plate 5.31	<i>Large clay bowl for men (akoji)</i>	148
Plate 5.32	<i>Clay pots, pot holder</i>	148
Plate 5.33	<i>Various types of calabash</i>	149
Plate 5.34	<i>Different types of clay gourds and calabash utensils</i>	149
Plate 5.35	<i>Various types of clay pots</i>	149
Plate 5.36	<i>Mortar and pestle</i>	149
Plate 5.37	<i>Maize grain powder</i>	150
Plate 5.38	<i>Corn meal and vegetable soup</i>	150
Plate 5.39	<i>Locally produced hoes</i>	151
Plate 5.40	<i>Locally produced spearheads</i>	151
Plate 5.41	<i>Wam pi mana</i>	161
Plate 5.42	<i>Area designated for household idol worship</i>	161
Plate 5.43	<i>Tangale traditional Bit-bit dancers</i>	166
Plate 5.44	<i>Kollo kwangam, drums for the kwangam dance</i>	166
Plate 5.45	<i>Logo with the Biliri python coiled around Biliri hill</i>	169
Plate 5.46	<i>Tangale peak seen from Kufai</i>	169
Plate 5.47	<i>New hut under construction</i>	171
Plate 5.48	<i>Base of the new hut</i>	171
Plate 5.49	<i>A freshly built mud hut ready for roofing</i>	171
Plate 5.50	<i>Remains of the stone base of a hut on the Tangale hills</i>	171
Plate 5.51	<i>Communal granaries belonging to an extended family</i>	172
Plate 5.52	<i>Raised stone base of a granary</i>	172
Plate 5.53	<i>Lubbo</i>	173
Plate 5.54	<i>Kulthur</i>	173
Plate 5.55	<i>Beginnings of the thatched roof</i>	174

Plate 5.56	<i>Fixing the piece that will hold the finial.....</i>	174
Plate 5.57	<i>Laying out the trusses.....</i>	175
Plate 5.58	<i>Raising the roof.....</i>	175
Plate 5.59	<i>Anchoring the frame.....</i>	175
Plate 5.60	<i>Rolling bound grass for bracing the roof structure.....</i>	175
Plate 5.61	<i>The circular braces in place.....</i>	175
Plate 5.62	<i>The topmost ring is pushed and the other supporting rafters are tied underneath it.....</i>	175
Plate 5.63	<i>The finished roof frame.....</i>	176
Plate 5.64	<i>Spreading the first layer of rolled thatch.....</i>	176
Plate 5.65	<i>The completed first layer.....</i>	176
Plate 5.66	<i>Spreading the thatch at the top.....</i>	176
Plate 5.67	<i>Tying the finial with two crossed sticks.....</i>	176
Plate 5.68	<i>The finished roof on the ground.....</i>	176
Plate 5.69	<i>Lifting the roof.....</i>	177
Plate 5.70	<i>Transferring the roof unto the top of the hut.....</i>	177
Plate 5.71	<i>Adjusting the roof on the wall of the hut.....</i>	177
Plate 5.72	<i>The roof on the hut.....</i>	177
Plate 5.73	<i>A boy holding inji or wooden slat bed.....</i>	178
Plate 5.74	<i>Typical Tangale traditional reclining chair made of palm fronds.....</i>	178
Plate 5.75	<i>Pobe's house in Kufa'i at the base of the Tangale hills.....</i>	182
Plate 5.76	<i>The first missionary clinic at Kufai.....</i>	182
Plate 5.77	<i>The first Native Authority (NA) clinic, Banganje.....</i>	183
Plate 5.78	<i>The first church building in Billiri.....</i>	183
Plate 5.79	<i>Rectangular mud bricks being dried under the sun.....</i>	185
Plate 5.80	<i>Mud huts and rectangular rooms in a compound in Billiri.....</i>	185
Plate 5.81	<i>A water vendor in Billiri.....</i>	189
Plate 5.82	<i>One of the numerous boreholes in the community.....</i>	189
Plate 5.83	<i>Mud thatched huts.....</i>	192
Plate 5.84	<i>Mud thatched huts in another compound.....</i>	192
Plate 5.85	<i>A combination of mud thatched huts and rectangular rooms.....</i>	193
Plate 5.86	<i>A rectangular room roofed with thatch.....</i>	193
Plate 5.87	<i>A street in Billiri lined with concrete houses.....</i>	193
Plate 5.88	<i>A newly built concrete compound in Billiri.....</i>	193
Plate 5.89	<i>Interior view of a courtyard in Billiri showing latest trends.....</i>	194
Plate 5.90	<i>Another house displaying current trends in the community.....</i>	194
Plate 6.1	<i>150mm wide concrete blocks being cured.....</i>	205
Plate 6.2	<i>225mm wide concrete blocks.....</i>	205
Plate 7.1	<i>Location of the prototype houses in Billiri.....</i>	271
Plate 7.2	<i>Prototype I, one of the empty units, front elevation.....</i>	272
Plate 7.3	<i>Prototype I units.....</i>	272
Plate 7.4	<i>Prototype II.....</i>	272
Plate 7.5	<i>Prototype II, front elevation.....</i>	272
Plate 8.1	<i>Remains of stone foundation of a hut on the Tangale hills.....</i>	313
Plate 8.2	<i>Material remains of a compound on the hills.....</i>	313
Plate 8.3	<i>Part of the Tangale hill range seen from Kufai.....</i>	313
Plate 8.4	<i>Tangale hills (peak).....</i>	313

PART ONE: PREAMBLE

“It can be argued . . . that vernacular architecture is the time honoured, truly sustainable architecture that in its multitudinous manifestations, has evolved over the centuries, changing or adapting when necessary to various environments and the nature of the family and societal growth”

Paul Oliver-Afterword: Raising the roof. In: Asquith, L. and Vellinga, M. (eds.) *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis, p. 265

CHAPTER ONE

CHAPTER ONE: INTRODUCTION

Summary

Chapter One introduces the background to the study and general field of research as well as key previous works and links to the present study addressed in subsequent chapters. The present study focuses on socio-cultural issues in housing in the North East region of Nigeria, which has received little by way of intense architectural research comparative to other regions. The chapter sets forth the need for research pertaining to housing and vernacular architecture in part to address the dearth of architectural information as well as to explore the relationship between changes in lifestyle and observed social related problems in the built environment. The study also analyses possible reasons behind the abandonment and modification of prototype housing in Tangale land, the study area.

1.1 Housing research and vernacular architecture studies in Nigeria

The rapid urbanization of indigenous communities due to an increase in population created an unprecedented demand for housing in Nigeria (Kabir and Bustani 2009, Ndubueze 2009, Folaranmi 2010, Ademiluyi 2010, Ibem and Amole 2010, Ayeyemi 2012). This is accompanied by a plethora of related social problems observed in the built environment. Notable in this respect are the loss of cultural identity (Mai and Shamsuddin 2008), a gradual breakdown in societal values and an increase in crime and insecurity (Maina, 2002), high cost of housing (Ibem, 2010), slums and the proliferation of unhealthy living conditions. These are reflected in the transformation of traditional compounds, changing urban morphologies and modifications or abandonment of public mass housing to conform to user lifestyles. In order to improve upon the dearth of architectural research in the country and proffer viable remedies and solutions to these and other socially related problems, stakeholders in the housing industry have made calls for studies into the socio-cultural needs and values of the different cultures in Nigeria (Onibukun 1990, FGN 2006, Jinadu 2007, Matazu 2008, Adejumo 2009, Rikko and Gwatau 2011). These usually take the form of surveys of traditional and vernacular architecture.

Earlier studies in this regard were commonly a response to the allusion that non-western buildings were not considered architecture (Prussin 1968, 1974, Vlach 1976, Saad 1987, *Science.jrank* 2011). This ideology was not confined to only African or Nigerian traditional architecture but shared by studies of non-monumental vernacular structures worldwide (Rapoport 1969, Denyer 1978, Oliver 1997).

Initial writings on vernacular architecture were in the form of diaries and commentaries of travellers and adventurers whose accounts later gave credence to ethnographical research on material culture of primitive or savage cultures in the late 19th Century (Oliver 1997, Prussin 1974). During the subsequent conquest of colonies, further ethnographical research to understand 'the natives' were carried out, complemented by the writings of missionaries which only on rare occasions, gave much attention to architecture. Many focused on art and sculpture, which being portable, could be carried off and displayed in museums (Prussin 1974, Denyer 1978). Buildings were a different matter; they couldn't be transported. The notable exceptions to this instance are the monuments in Egypt. This produced an exotic picture which was viewed through the only lens its authors were acquainted with, the western Vitruvian architectural standards of firmness, utility and delight¹ (Muhammad-Oumar, 1997); of permanence, large scale works and monumentality (Saad, 1987). A shift in western thinking came with a redefinition of what should constitute architecture i.e. what man built and identified with as a means of self expression in the built environment through the writings of critics like Allsop, Rudofsky, Rapoport, Alexander, Jencks, Baird and Norberg-Schulz. Only then was African architecture taken as worth studying (Prussin, 1974).

1. Vitruvius. The ten books of Architecture. Translated by M. H. Morgan (1960). Dover.

Within this framework of studies in vernacular architectural traditions, two streams of discourses exist, “one generally dealing with historical western traditions and the other with contemporary non-western ones” (Asquith and Vellinga 2006:4). The former seemed largely concerned with the documentation and understanding of the historical and rural pre-industrialized building heritage and tradition. These can be described as a romanticized nostalgic description of “a longed-for past glory” (Oliver 1997:xxiv). Studies in the latter group document particular vernacular building traditions within a cultural and historical context. These are “increasingly complemented by analyses of the ways in architectural design, use and meaning of these traditions change within the context of contemporary processes of modernization and globalization” (Asquith and Vellinga 2006:5). Invariably, recent studies in housing, traditional and vernacular architecture in Nigeria fall within this milieu.

Earlier works on Nigerian architecture focused on the documentation of housing and vernacular typologies, unique building construction techniques, use of available local technologies, materials and sometimes meaning (Schwerdtfeger 1982, Moughtin 1985, Dmochowski 1988, 1990). Recent studies have begun to focus more on issues relating socio-cultural values with symbolism inherent in form, peculiar interpretations, space and spatial morphologies (Popoola 1984, Oluyemi 1996, Uduku 1996, Mohammad-Oumar 1997, Mbina 1999, Mai and Shamsuddin 2007, 2008, Ikebude 2009, Odeyale et al. 2010). The focus of these studies have however remained on major tribes and urban societies in Nigeria usually delineated along well documented language groups like the Hausa, Igbo, Yoruba, Efik, Gwari etc² (*Figure 1.1*).

2. This is discussed in more detail in Chapter Two, the Literature Review.

These cultures are found in the South, North West and North Central Nigeria, with comparatively little or no intense architectural research carried out in the North East region. This is an area inhabited by numerous but smaller language groups. The only example of architectural research in this region was a response against Rapoport's now well known assertion that socio-cultural factors assume primacy over physical determinants of house form (Saad, 1991).

Saad's paper challenged Rapoport's theory, which assigns secondary roles to physical determinants of house form. These include climate, topography, available materials, level of technology, defence and method of construction, insisting that socio-cultural factors assume primacy (Rapoport, 1969). Saad asserts that in arriving at this conclusion, Rapoport "seems to have selected samples on the basis of whether they fit his hypothesis or not" (Saad 1991:253) maintaining that ranking determinants of house form would vary from group to group depending on the circumstances of existence of such a group. Saad continues the attack on Rapoport's methodology that "given the complexity of human society and the diversity of cultures and physical settings, it is possible to prove most hypotheses if we select our cases on the basis of whether they suit the hypotheses or not" (Saad 1991:255). This may be the reason behind Saad's choice of eight cultures found in mountainous areas and Riverine basins of North East Nigeria where the effect of the physical hilly and mountainous environment cannot be overlooked (*Figures 1.1-2, Plates 1.1-3*). While there is little or no doubt as Saad says, these tribes could be considered minority tribes in the region as opposed to the majority or dominant Hausa, Fulani and Kanuri, it can be argued that other tribes within the region fit the criteria of selection-the Tangale, Tula, Tera, Waja, Longuda to mention but a few. This point notwithstanding, Saad's study of the identified tribes was carried out using the following categories: the Mandara highlanders (Higgi, Marghi and Burra, *Figures 1.3-9*), the Benue Valley dwellers (Bachama and Riverine Jukun) and the Jos Plateau cluster (Angas,

Rukuba and Taroh). The research findings describing, a general trend across the sample, are outlined hereunder.

The circular hut with thatched roofing forms the basic traditional dwelling with rectangular buildings adopted as a new form resulting from the diffusion of techniques and modernization. The incursion of money economy, modern materials and technology into traditional settings impacted the lifestyle, worldview and consequently the dwelling forms of the people. Furthermore, a monogamous institution introduced by the Church affected residential forms by reducing family size. Returning migrants have a new world view and different architectural models on their minds which influence those at home, accelerating the change from traditional house form to the vernacular. This can also be connected to Saad's next point, that of the dwelling serving as a status symbol as its size, number of huts and area enclosed by the fence wall represent a man's capacity to marshal labour and material (Saad, 1991).

Saad however admits that given the circumstances of the research and field methodology adopted it was not possible "to come up with a positive theory on the preponderance of the influences of either physical factors or cultural factors on the house forms in traditional societies in general, or even the particular cases studied" (Saad 1991:267). This validates his earlier claim that it would have been even more difficult for Rapoport to ascertain similar findings in a much larger domain. It raises pertinent questions on the validity of an extensive multi-cultural methodological approach for this kind of research, especially when discussing issues concerning housing and domestic architecture for a specific culture or tribe. This is not surprising as the aim of the paper was to disprove Rapoport's hypothesis and not necessarily to unearth culture specific architectural data which is critical in addressing housing and social related problems as advocated by stakeholders in the industry.

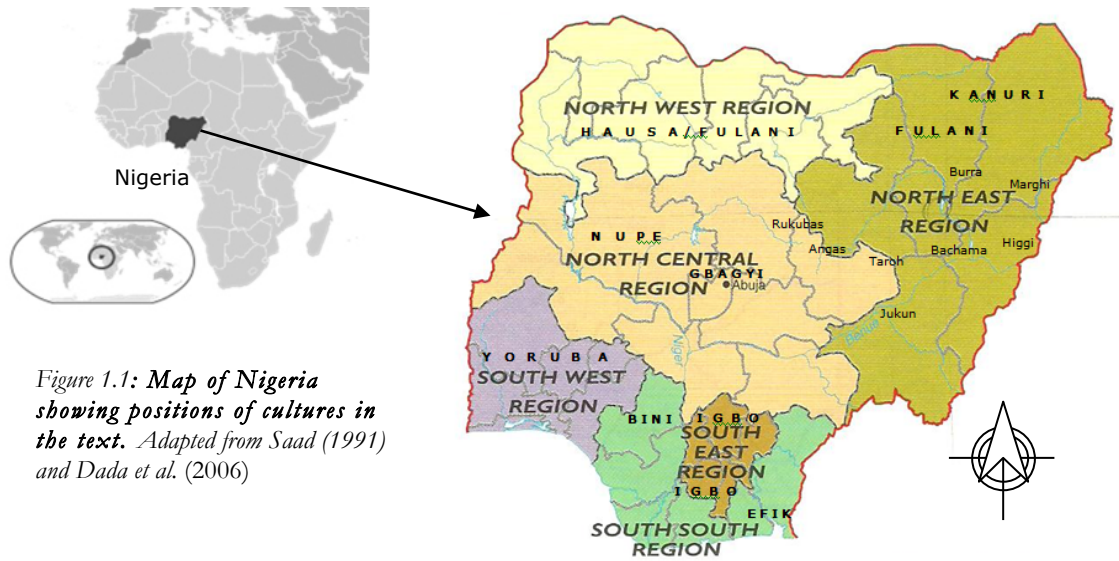


Figure 1.1: Map of Nigeria showing positions of cultures in the text. Adapted from Saad (1991) and Dada et al. (2006)

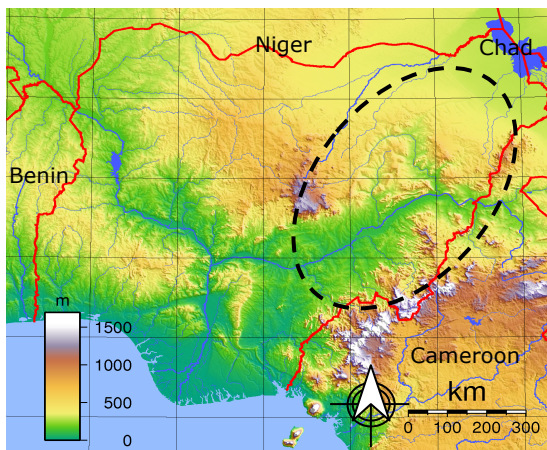


Figure 1.2: Topography of Nigeria. Note undulating terrains of the North East region (in dotted lines). Adapted from Wikipedia (2012b)



Plate 1.1: View of the A345 i (along the Kaltungo-Yola road, North East Nigeria). Note the hilly terrain in the foreground. Courtesy: Jonathan Yusuf, October 2012



Plate 1.2: View of the A345 ii (along the Cham-Yola road, North East Nigeria). Courtesy: Jonathan Yusuf, October 2012



Plate 1.3: Outcrop of rocks along the A345. Courtesy: Jonathan Yusuf, October 2012

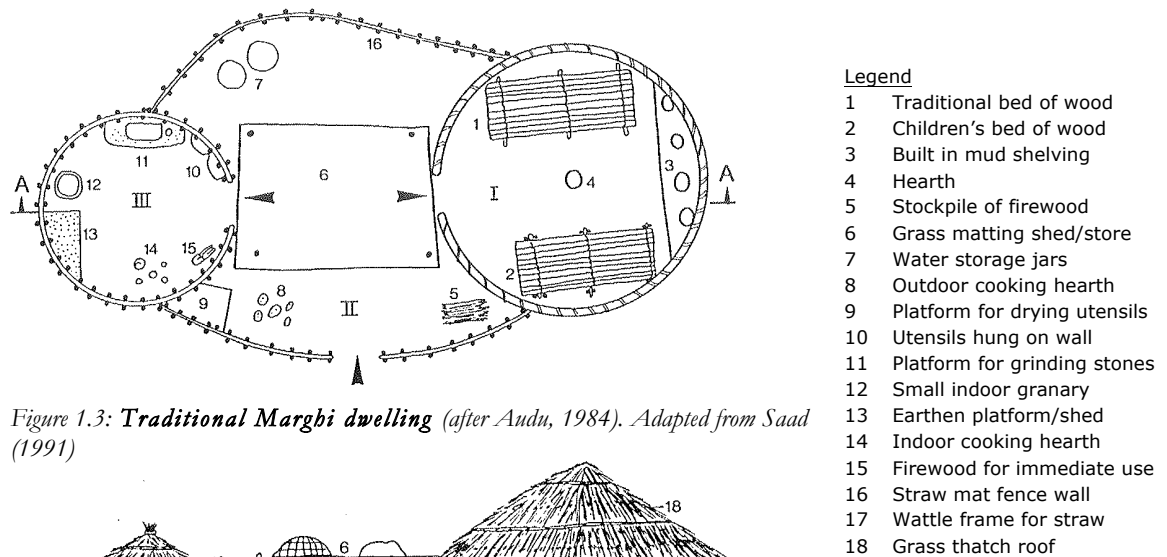


Figure 1.3: **Traditional Margbi dwelling** (after Audu, 1984). Adapted from Saad (1991)

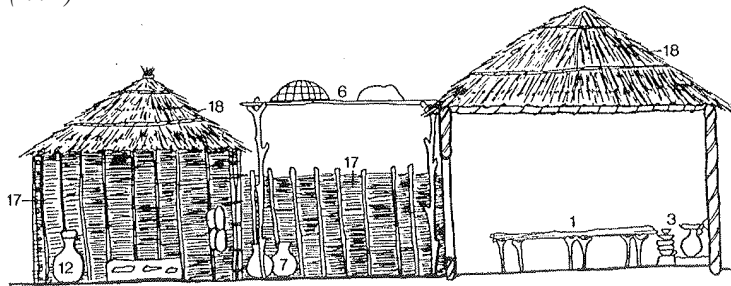


Figure 1.4: **Section A-A, traditional Margbi dwelling** (after Audu, 1984). Adapted from Saad (1991)

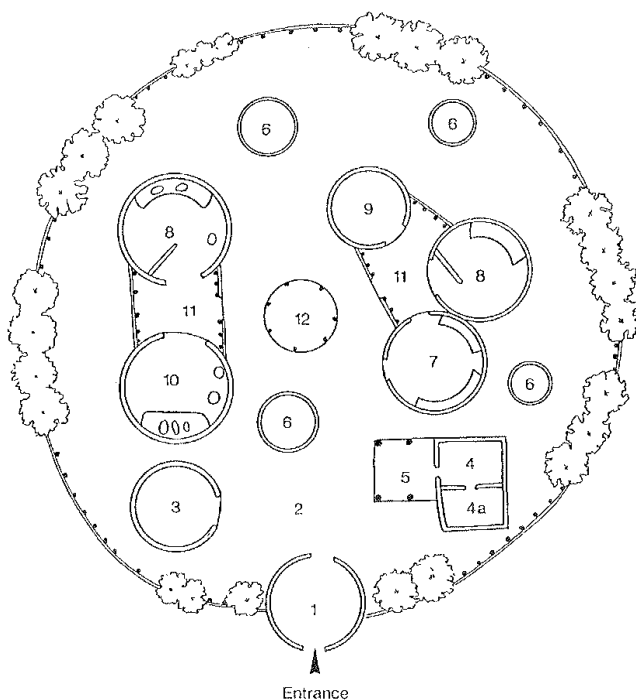


Figure 1.5: **Traditional Burra dwelling, a compound on the Bin Plateau** (after Bukar 1984). Adapted from Saad (1991)

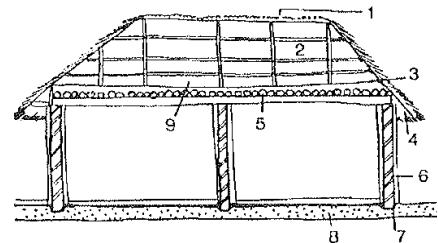
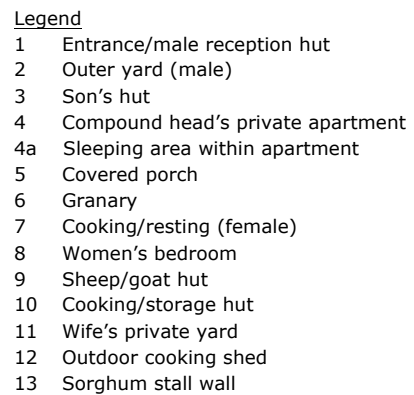
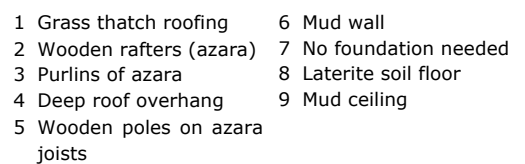


Figure 1.6: **Section through man's rectangular apartment**. Adapted from Saad (1991)



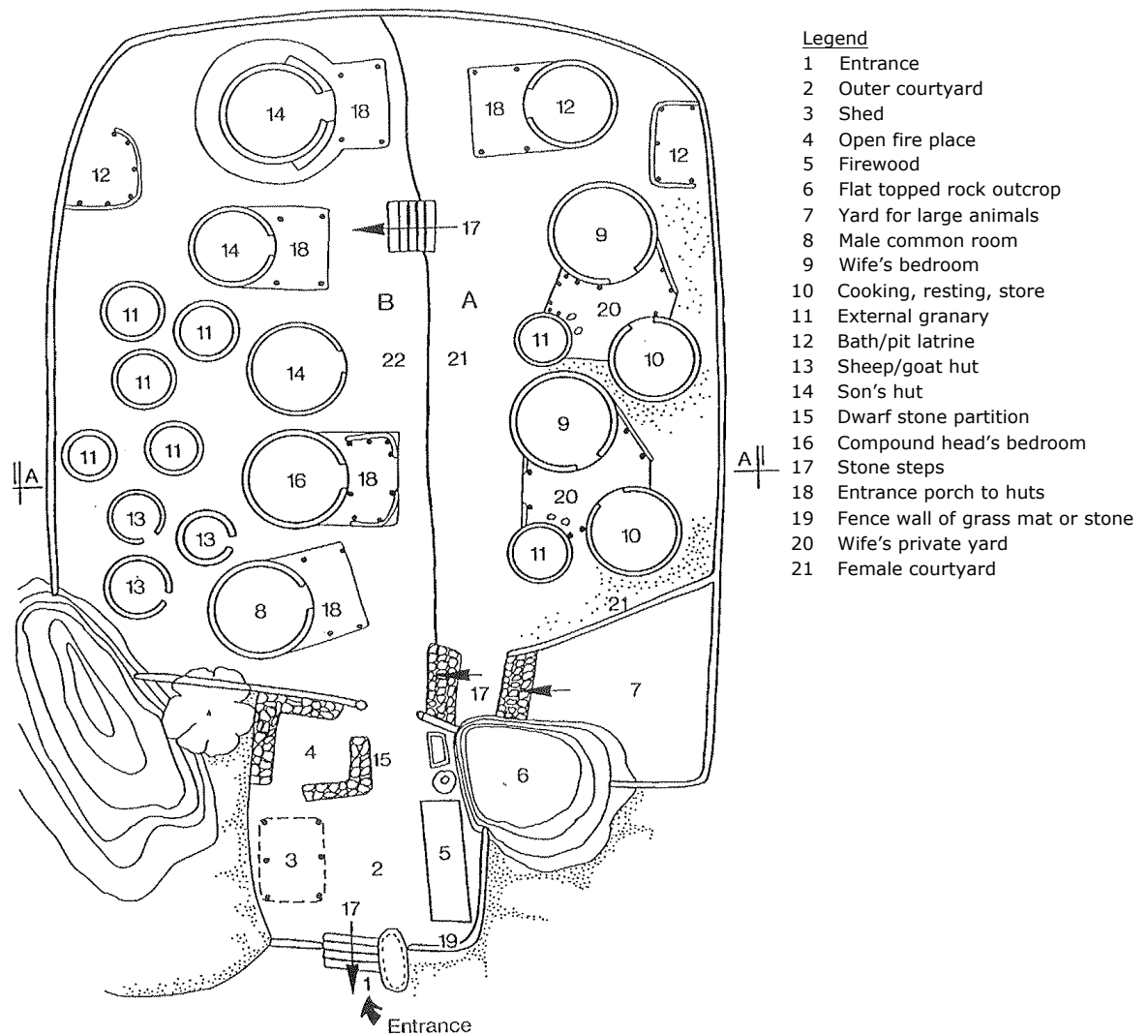


Figure 1.7: Floor plans of a traditional Higgi dwelling, Mandara highlands (after Kwada 1987). Adapted from Saad (1991)

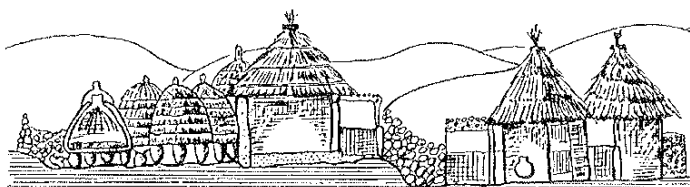


Figure 1.8: Section A-A, traditional Higgi architecture (after Kwada 1987). Adapted from Saad (1991)

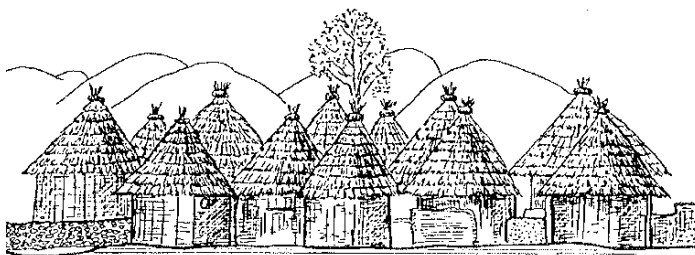


Figure 1.9: Elevations, traditional Higgi architecture. Adapted from Saad (1991)

1.2 The need for culture specific housing and architectural studies in North East Nigeria

From the discussion on research carried out on Nigerian traditional and vernacular domestic architecture so far, two issues can be discerned. Firstly, early studies were extensive by nature of their purpose, usually covering the area of building materials, technology and typologies in most parts of the country. They are however carried out within large urban areas or around well-documented cultures, with little or no research carried out in non-urban societies or traditional communities. This gap is most evident in the North East region, considered mostly inaccessible in part due to hilly and mountainous terrain.

Secondly and importantly, no culture specific research has been undertaken in the North East region regarding housing and domestic architecture with a focus on the following issues:

- A dearth of intense architectural research in housing especially relating to socio-cultural needs of minority tribes.
- An observed increase in socially related problems including the loss of cultural identity, rising housing cost, slums and crime which are related to increase in population, urban migration and changes in lifestyle as reflected in the built environment.

The North East region, covering an area of about 280,000 sq.km (Law, 2011) and a population of about 19 million people (FGN, 2009) has also in the last two years recorded an unprecedented rise in insecurity and insurgency (Awom 2012, Herskovist 2012). This generated heated debates in economic and social media circles about the link between crime and imbalances of national resource allocation (Wallis 2012, Eyam-Ozung 2012, Adebawale and Ogbu 2012). These raise questions about the relationship (if any) between changing socio-economic lifestyles, crime, insecurity, loss of identity, slums and squatter environments.

- The region has also arguably attracted the least government funding over the last seven years (Utomi, 2012), making the abandonment and modification of public prototype housing in some of these communities particularly unfortunate. In order to address escalating housing needs of the Nigerian populace, the government through various housing policies and programmes embarked on the provision of public housing units from colonial times. Notable among these was the Shagari low cost housing scheme in 1980, which saw the provision of one-bedroom prototype units in most Local Government Area (LGA) headquarters, twenty of which were constructed in Billiri as part of a national housing scheme. They were however abandoned. Another category of three-bedroom prototype units, common in the North East region were either abandoned or modified³. It will be of great benefit and interest to analyse the reason behind the abandonment and modification of such units.

Having established these, the question would then arise as to why, even in the North East region, the choice of Tangale land as the study area. The choice was due to the following reasons:

- Firstly, the Tangale people, according to historical records, were the first to settle in the Gombe area around 13th-14th Century, much earlier than even their neighbours and present occupants of Gombe Emirate, the Fulani (Gwani 1999, 2003, Wakaye 2002, Amuga 2003, Attah 2004, Muleka mu gani 2010). The centrally situated Gombe area inhabited by tribes other than the Fulani or Hausa remains largely unexplored in the field of intense architectural research (*Figure 1.10*).

³ These are discussed and analysed in Chapter Seven, Prototype housing in Tangale land.

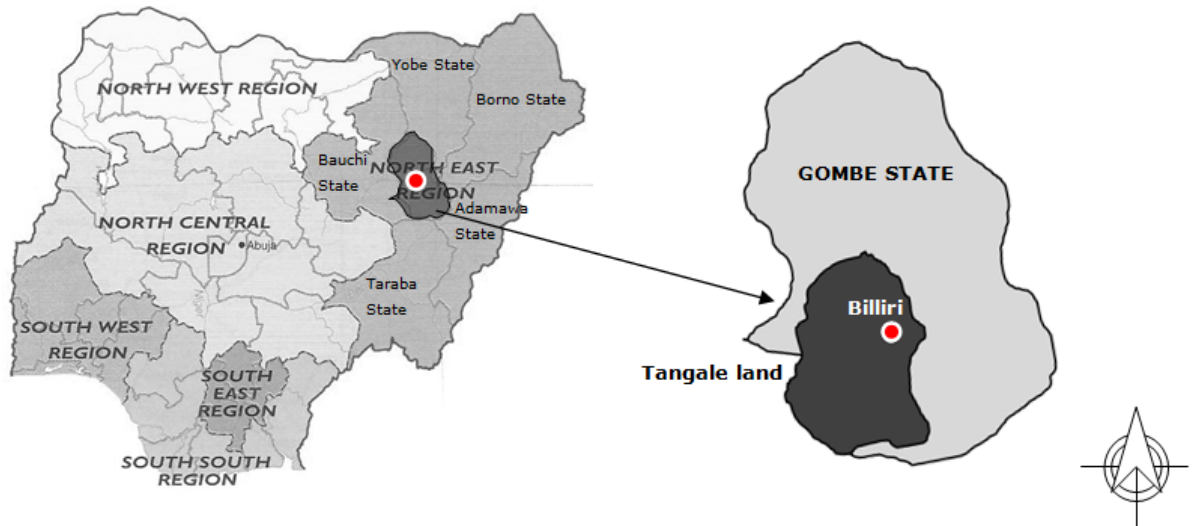


Figure. 1.10: Location of Tangale land in North East Nigeria. Adapted from Dada et al. (2006)

- Secondly, due to this location Tangale land invariably has ties to the surrounding tribes. This is evident in commonalities of language and culture (Kure, 1987). Amuga (2003:1) asserts “anthropologists agree from linguistic trends that most nationals in the present day Yobe, Gombe, Plateau and Adamawa States have linguistic semblances with the main Tangale people of Gombe State”. Any research carried out in this area is likely to have far reaching effects within the region.
- Thirdly, very little has been documented about the settlement, ethnography or architecture of Tangale land (Maina, 2009).
- Fourthly, it presents a homogenous society undergoing urban transformation from rural settings (Maina 2002, Attah 2004).
- Fifthly, the community has developed a vernacular architecture almost devoid of external influences, bar those of Colonial forces, Missionaries and the inevitable globalization process. This makes it ideal for a study of vernacular trends over the period of the tribe’s history. It also provides a basis for comparison of any spatial and morphological differences between houses produced by the community and those provided by government.

•

1.3 Tangale land, the study area

The Tangale people originated from the Middle East in Yemen and migrated in stages through the old Borno Empire where they intermingled and later separated from other neighbouring cultures. They settled on the Tangale hills in seven clans based on a strong social kinship network (*Plates 1.4-5*). This location changed in 1948 when the community relocated northwards to the surrounding plains towards Billiri and environs, which presently serves as the administrative headquarters of the LGA. The form of settlement based on clans underscores the basic lifestyle of the people and influences many activities to present day. Traditionally, Tangale compounds and settlements, *mana* are organised in areas belonging to seven clans. These are Tangaltong, Tal, Kalmai, Banganje, Tanglang, Todi and Nathe. Each clan was responsible for the welfare of its members, overseen by the *Mai* or ruler. *Mana* is a term in the Tangale language, which refers to a house/compound, the home, family or community depending on the context used. Housing in this community, as commonly found in many traditional Nigerian settlements, comprises of a compound containing several housing units and other supporting structures within a ward. The use of this term in the title of this thesis encompasses all of the above and portrays the complexity of the language, which is highly descriptive⁴.

With the relocation of the community and changes in administrative setup, provision of infrastructure and welfare became the responsibility of the State Government, altering the traditional set-up especially in urban towns, which are linked by tarmac roads. The effects of urbanization are best seen within these towns, which exhibit compound transformations, an increase in delinquency, slums and deteriorating sanitary conditions. In Billiri, the availability of beer imbibed by youth out of work, many of whom are poorly trained in part due to

⁴ The Tangale language is arguably the most developed aspect of the community's culture (see p. 167-168)

falling educational standards has fostered delinquency and the growth of slums and areas considered insecure by many residents (*Plate 1.6*). Consequently, good quality and more expensive residential developments are found largely in areas considered secure (*Appendix 13*). Weakened community surveillance and control strategies hitherto controlled by clan leaders in traditional times have aided poor sanitary and security measures in many parts of the community, as evident by refuse dumps lining footpaths and streets (*Plate 1.7*). These and other related issues are the focus of Chapter Five on Tangale Ethnography.



Plate 1.4: Part of the Tangale hill range seen from the surrounding plains. Fieldwork, January 2011



Plate 1.5: View of a settlement seen from the Tangale hills. Fieldwork, January 2011



Plate 1.6: The main street in Billiri. Note the stacked up crates of beer in the foreground. Fieldwork, January 2012



Plate 1.7: A footpath in Billiri. Note the refuse in the foreground. Fieldwork, January 2011

1.4 Aims of the study

This thesis therefore aims to:

- Explore factors, themes and concepts that influenced house form and residential structure in the Tangale traditional setting and analyse any changes in the identified factors over time.
- Establish contemporary socio-cultural determinants of house form and residential structure that can be useful in policy making and future planning of the built environment in Tangale land and others with similar cultural backgrounds.

1.5 Objectives of the study

The objectives of the thesis are:

- To carry out an extensive literature review on vernacular architecture studies to unearth current concepts and trends, which have been used for related studies.
- To develop appropriate methodologies from the literature review in order to achieve the aims for the study.
- To study the ethnography of the Tangale people in order to establish the basic lifestyle, worldview and characteristics of Tangale traditional architecture and to demonstrate how this is supportive of the socio-cultural set up of the community.
- To explore housing transformations and establish consistent themes in Tangale domestic architecture over the period of its history especially from the turn of the 20th Century to present day.
- To establish factors which influence house form and residential structure and proffer suggestions that can be useful in the formulation of appropriate housing and urban development policies in the area.

1.6 Research questions

The questions posed by the thesis are as follows:

- What is the basic lifestyle of the Tangale community and how is this reflected in the morphology of their built environment?
- How has it changed over time?
- Which factors, themes and concepts have been consistent through the course of the community's history? Why have they been sustained?
- What is the relationship (if any) between changes in lifestyle and the observed social problems in the community?
- Are there any spatial or morphological differences between houses produced by the community and those provided by Government?

1.7 Research hypotheses

The following are the hypotheses set out by the study:

- *That continuity and rupture portrayed in the history of the community resulted in the fission and fusion of political, social and environmental ideologies which have had profound effects on domestic architecture and the built environment. This is evident in the transformation of building typologies, transfer of technology, changing gender roles and an increase in socially related ills observed in the community. Architecture plays a passive role as a container and reflector of dynamic culture.*
- *That the Tangale people have maintained a basic spatial morphology which has been translated from the traditional setting over time into a modern day equivalent, with the use of open courtyards as the focus of day to day domestic living. This is also a strategy for maintaining communal identity. Architecture serves an active role as a mechanism of cultural resistance.*

1.8 Scope and delimitations

Tangale land, occupied by the entity of people known as Tangale, lies South of Gombe Emirate, between longitudes 11° and 12° West and latitudes 9° and 10° North in the present Gombe State of Nigeria, just around the Tangale Peaks and highlands. It is home to a population of over 200,000 inhabitants (NPC, 2006a) and covers a total land area of approximately 750 km². Although the Tangale people are found in two other States in small numbers, by far the vast majority are settled in this location. Thus, the research will be carried out within this delineated area.

1.9 Thesis organization

The thesis is organized in three parts (*Figure 1.11*). Part One consists of four chapters-the Introduction (Chapter One), Literature Review (Chapters Two and Three) and the Research Methodology (Chapter Four).

Chapter One introduces the background to the research problem in three distinct but interconnected issues-dearth of intensive architectural research, an observed increase in social ills and the abandonment/modification of government provided prototype units in the study area. It also presents the aims, objectives, research questions and hypotheses postulated by the research as well a brief introduction to the study area and nature of traditional community organization, settlement pattern and housing.

Chapter Two reviews literature on research conducted on vernacular architecture in other communities in Nigeria under six broad chronological categories to establish the gap in knowledge as well as identify methodologies employed in similar studies. The categories include West African vernacular architecture, documentation of Nigerian vernacular architecture, prototype mass housing, search and synthesis of styles in Nigeria, regional architecture/effects of urbanization and contemporary housing studies. The predominant use of

interdisciplinary approaches employed for similar studies in other countries provides the link between this chapter and Chapter Three.

Approaches to the study of vernacular architecture from allied disciplines of the built environment are the focus of Chapter Three. Methodologies from anthropology, behavioural studies, sociology and architecture are discussed in order to address the aims of the study. These were then synthesized in a framework discussed in the next chapter.

Chapter Four presents the methodology and approach adopted for the study based on a conceptual/theoretical framework comprising five concepts garnered from the literature review. These include user lifestyle, use of space, house form/residential structure, spatial configuration and socio-cultural factors. The chapter also presents criteria employed in choosing the sample population for the two surveys subsequently conducted as well as modalities for interpreting results.

Part Two presents the research findings in three chapters. Chapter Five is a discussion on Tangale Ethnography with a focus on the main historical events that shaped what is the Tangale community today. It sheds light on the relationship between changes in lifestyle of the Tangale people and the community's reaction to external influences as expressed in the built environment.

Chapter Six analyses housing in Tangale land via a documentation of scaled measured drawings and space syntax analysis of 45 selected compounds alongside socio-cultural factors influencing house form and residential structure in the community. It also proffers explanations for the sustainability of certain themes and values as established by the research.

Chapter Seven compares compounds built by the community and prototype units constructed by government. These are analysed using space syntax methods as well as observations of space use in compounds produced by community residents and prototype units.

Part Three concludes the report, with a brief summary based on the research questions and hypotheses alongside recommendations and areas for further research emanating from the study. The relevant appendices and references to the thesis report follow these.

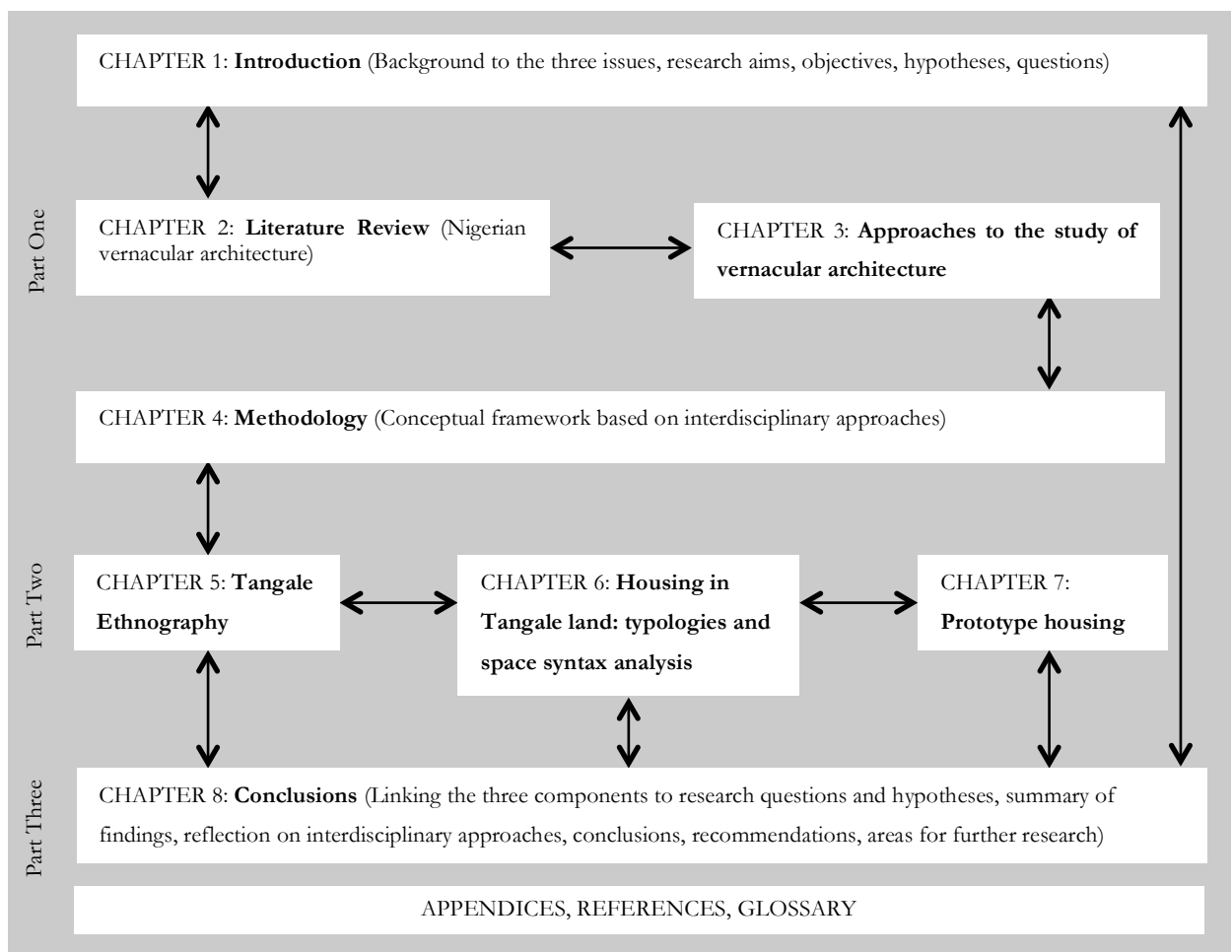


Figure 1.11: *Thesis organization*

CHAPTER TWO

CHAPTER TWO: NIGERIAN VERNACULAR AND DOMESTIC ARCHITECTURE

Summary

This chapter reviews literature on Nigerian traditional and vernacular architecture. The aim was first, to establish the gap in knowledge particularly in the North East region. Secondly, to evaluate methodologies used and their effectiveness in achieving the goals set forth by the various studies, main findings and contributions to the area of housing and vernacular architecture. Ethnographical, measured and demographical surveys were found to be the common research instruments accompanied by interviews, drawings and photographs. Exploratory in nature, early studies tended to be documentary, often lacking theoretical methodologies linking theory to practice. In the last decade however, studies have emerged which combine quantitative analytical methods like space syntax with surveys to explore spatial morphologies and establish socio-cultural factors.

As introduced in Chapter One, housing research in Nigeria is intricately linked to studies in traditional and vernacular architecture. Chronologically, these can be classified under six categories-early studies in West African vernacular architecture, documentation of Nigerian vernacular architecture, prototype mass housing schemes, the search and synthesis of styles in Nigeria, regional architecture/effects of urbanization and contemporary housing studies (Figure 2.1).

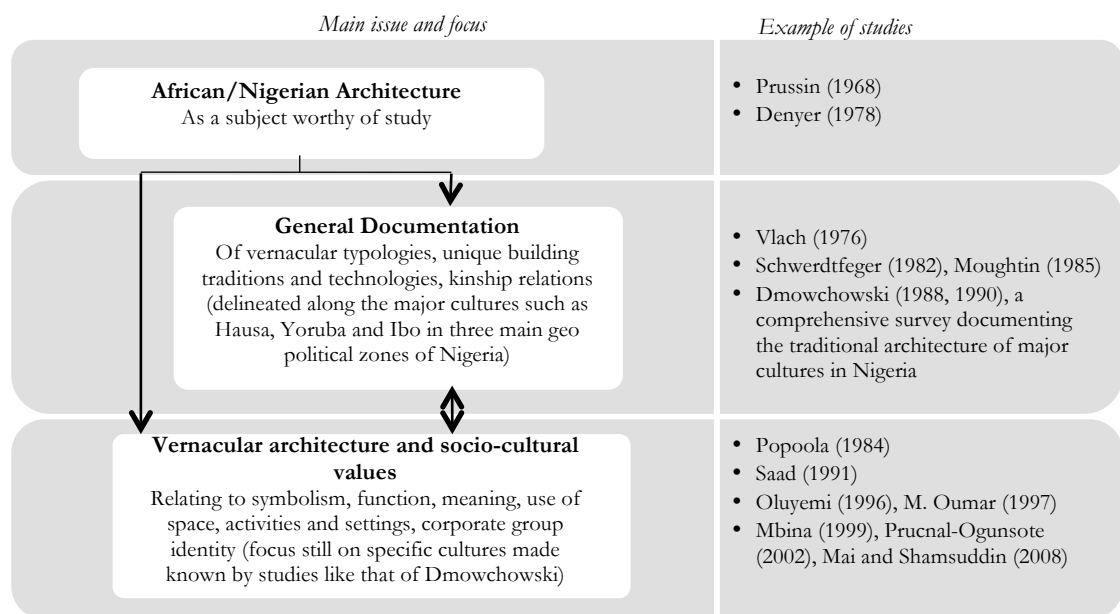


Figure 2.1: Framework for the study of African and Nigerian vernacular architecture

2.1 Early studies in West African vernacular architecture

Nigerian indigenous and vernacular architecture has been the focus of several scholarly works, which laid the basis for contemporary discourses on housing and cultural issues. Early examples were commonly a response against the western construct that African and Nigerian architecture were not worth serious study⁵. Notable in this regard are the works of Labelle Prussin and Susan Denyer.

The works of Prussin are a testament to over four decades of research in West Africa. The New York architect is one of the oldest and boldest voices in making a case of African Art and Architecture as unique and worthy of extensive study (*Plates 2.1-3*). In *An introduction to Indigenous African Architecture*, Prussin challenges the issue of permanence associated with traditional Western canons of architecture as existent insofar as "it marks the place made sacred by the ancestral habitation" (Prussin 1974:204-205). Using the concepts of centre, boundary, path, direction, area and domain, the author passionately argues that while not represented in the ways Western culture is used to, African Architecture portrays, in the words of Norbert-Schulz (1974:114) "man's need to establish a meaningful, coherent and stable architectural image which he can identify and relate to". This is not a theme relegated to one paper as Prussin has also championed the case of non-permanence and mobility of nomadic tribes (Prussin, 1995) and the role of women and the female gender in African Nomadic Architecture⁶.

⁵ Refer to p. 4

⁶ Prussin, L. (2002). African Nomadic Architecture. *Indian Folklife* Vol. 2 Issue 1 (July 2002) p 12-13. A photo essay on a book by the author, African Nomadic Architecture: Space, Place and Gender (1995). Prentice Hall.



Plate 2.1: *The great mosque at Djenne.* Source: Prussin (1968)

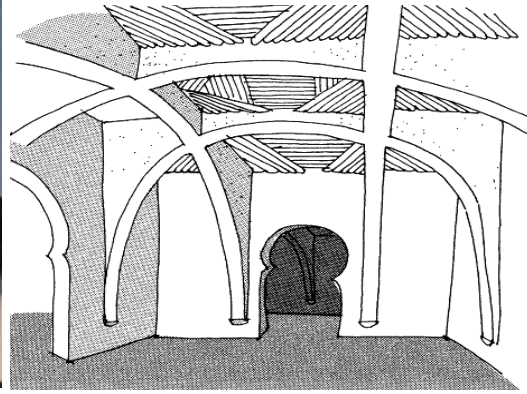


Figure 2.2: *Hausa vaults.* Source: Prussin (1974)



Plate 2.2: *Tallensi compound, Northern Ghana*
Source: Prussin (1974)



Plate 2.3: *Classic Djenne façade with its flanking quoins.* Source: Prussin (1974)

In passionately expressing her views, Prussin has oft been criticized for taking them too far. The author's assertion that the Fulani are responsible for the unique building technology in Hausa land, specifically the vaulted dome construction technique Hausa *magina* are famed for,⁷ illustrated in *Figure 2.2* was challenged by Saad (1987) and Schwerdtfeger. The latter notes her sources as second hand to the detriment of facts which didn't fit her theories, "resulting in guesswork, too many generalizations and over simplification" (Schwerdtfeger 1990:152-153). In spite of such inconsistencies, Prussin continued, undaunted in her efforts to study, document and theorize Architecture in West Africa⁸.

⁷ Prussin (1986) pp. 199-200

⁸ Prussin, L. (2011). 'Convivencia' at Timbuktu: Jewish influence on West African Architecture and Jacobs, J. (2003). *African Architecture in transit: Tents and Textiles*.

Denyer addresses a related issue, the difficulty in accepting traditional buildings of the African continent meriting more than passing consideration⁹. Her book, extensively covering over one thousand five hundred different groups and tribes in mainland Africa was to “avoid the temptation of explaining away the source of some style as being somewhere outside the particular part of Africa covered” (Denyer 1978:2). Another aim of the book was to dispel the notions that a homogenous material culture exists throughout the continent towards allusions made by even serious scholars in the field that all African buildings are round and similar (Denyer, 1978)¹⁰. Given these two purposes, Denyer’s work, organized under a system of subjects like settlement, states and towns, sacred ceremonial and community buildings, defence, the building process, taxonomy of house forms, distribution of styles and impact of modernization helped to dispel this notion. It is often quoted as a basis for studies on traditional and vernacular forms of African architecture.

2.2 Vernacular studies and documentation of Nigerian traditional architecture

Early works in Nigerian vernacular architecture were generally extensive in nature and documented salient aspects of housing and other typologies around large cultural groups and well developed urban societies in the three main geopolitical zones of the country. These were invariably the Yoruba, Igbo and Hausa cultures discussed in the writings of Vlach (1976), Schwerdtfeger (1982), Moughtin (1985) and Dmowchowski (1988, 1990).

⁹ Denyer (1978:1)

¹⁰ Examples of such remarks relate to the rich mud building typologies found in Africa (see *Plate 2.1, 2.3* and *Figure 2.2*). Also see *Science.franc* about the origins and technology of Egyptian architecture; Marchand (2009) *The Masons of Djenné*, a book that describes the rich mud building technology and workmanship of Djenné in Mali.

John Michael Vlach's study on Yoruba architecture in South West Nigeria aimed at understanding the creativity and symbolism that constitutes the conceptual foundation of buildings in Yoruba house form distinct from Western constructs of architecture. The methodology involved case studies, documentation of actual buildings accompanied by drawings, photographs and interactions with the people in their environment. The author astutely asserts that the ideals of the Yoruba for intense participation in social, family and personal affairs is reflected in the form of the town, compound and farm houses (Vlach, 1976). Vlach notes the basic domestic unit, the Yoruba compound, is for a living that encourages and fosters success of the extended family (*Figure 2.2, Plate 2.4*). This is "the primary cultural motivation that determines the forms that architectural expression follows" (Vlach 1976:53). The author posits the forms of Yoruba towns and cities demonstrate fundamental artistic ideals with roughly circular walled cities that contain the *afin* or palace of the king and market at the centre, illustrated in *Figure 2.4*. This inner core was also the focus of religious, political and economic activity, interlocking with each other in a continuous system of dependency. Building plans and sizes also denote relative societal ranking and establish the symbolic significance of the town plan by directing attention towards the centre. These findings have undoubtedly enriched our theoretical understanding of Yoruba architecture.

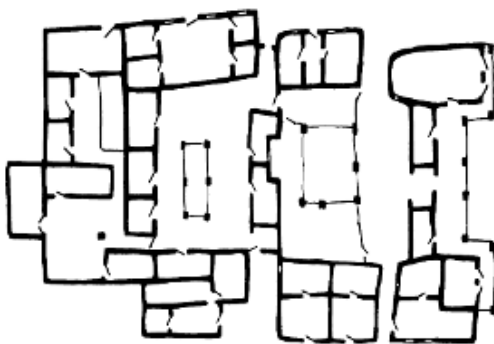


Figure 2.3: Plan of a family compound, Ile-Ife. Source: Vlach (1976)



Plate 2.4: Front elevation of the compound in Figure 2.3 Source: Vlach (1976)

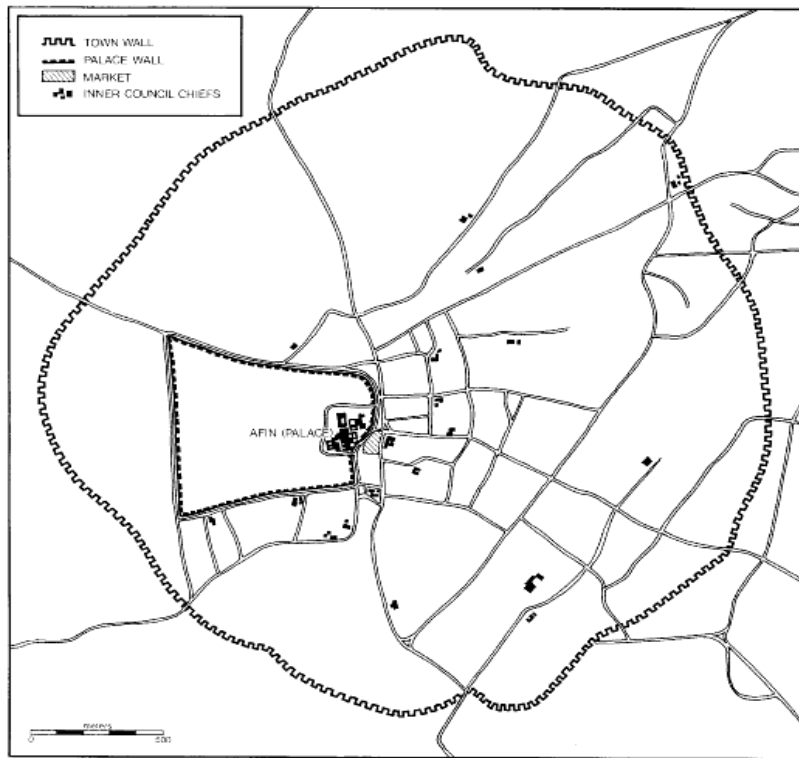


Figure 2.4: *Circular plan of a Yoruba city, Owo*. Note the central position of the Afin's Palace and market and residences of important Council Chiefs. Source: Vlach (1976)

Schwertfeger's book, *Traditional housing in African cities*¹¹ addresses the issue of traditional houses in African, Asian and Latin American cities receiving little attention despite providing for the overwhelming majority of the urban populace. The work aimed to provide information on housing conditions in three selected African cities as well as describe and analyze the complex relationships, which hold between traditional urban houses and their inhabitants. The cities selected were Zaria in North Central Nigeria, Ibadan in South West Nigeria and Marrakech, Morocco (Schwertfeger, 1982). The selection criteria necessitated that towns were firmly established long before colonial rule. They also possessed a largely undistributed central area in which the pattern of domestic groups and their building activities could be studied. Schwertfeger's methodology consisted of identifying a central area of each town, one surrounded by the city wall excluding modern residential zones, fallow land, markets and parks. This area was then

¹¹ This book is a revised version of Schwertfeger's PhD thesis at University College London (1975)

divided into contiguous plots and transposed over an aerial photograph of the city. One house, typical of houses in each plot was selected and marked on the photograph with the help of the ward head of the area. These the author then physically measured, noting furniture, new construction, improvements etc. A detailed questionnaire was used to gather information relating to demographic factors of the occupants. These included the number of people living in the house, their relationship to the compound head, age, birthplace, ethnic identity, length of residence stay, educational attainment, occupation, the economics of everyday living, building and maintenance costs. Schwertfeger's systematic method of study suited the investigation of the relationship between co-residential kinship groups and the layout of their houses. Eyong (1990) notes the rigorous methodology as the strength of the study, adding that the study would have however yielded more significant results if the author had linked it with the general theories of architectural meaning.

Notwithstanding, Schwertfeger notes the existence of a cyclic tendency that underlies the growth and decline of agnatic co-residential kinship groups as revealed in their homes. There was also a continuous process of cultural change through the assimilation of new ideas involving indigenous African culture, Islam and Western influence. This contributed to the reduction of the size of co-residential families, the modification of traditional house styles (*Plates 2.5-6*) or the outright adoption of foreign patterns of housing (Schwertfeger, 1982). Saad (1991) and Mai and Shamsuddin (2008) later made similar findings in their studies on other communities in Northern Nigeria.

Schwertfeger also notes the flexibility of compounds enabled each new generation of compound heads to provide exactly the accommodation needed for their families in Zaria, commonly constructed with mud (*Plate 2.8*). This was later reiterated as a basic characteristic of Hausa domestic architecture by Muhammad Umar (1997) in his study of Kano city. A more complex relationship existed in

Ibadan and Marrakech between domestic groups and the layout of houses “partly due to the shortage of suitable building sites, restricting the construction of new rooms” (Schwertfeger 1982:313). Such practice, unlike obtained in Zaria was mostly undertaken as a capital investment for rent, an additional source of income. This finding is important as it describes the economical way of life in the cities which makes it difficult for traditional housing practiced in the rural areas to be adapted to urban conditions (Plate 2.7). This point was also expressed in Popoola’s study on Katsina, another Hausa city.



Plate 2.5: **Hausa house.** Source: haus-aminus3.com



Plate 2.6: **Hausa decorated facade.** Source: www.kanopystreaming.com



Plate 2.7: **Typical village setting in Northern Nigeria.** Source: www.alltravels.com



Plate 2.8: **Magina, local Hausa builders at work with sundried earth bricks found in most parts of Northern Nigeria.** Source: haus-aminus3.com

Among studies documenting the rich culture and traditional architecture of Nigeria, *An Introduction to Nigerian Traditional Architecture* has “become something of a legend in its own right” (Moughtin 1988:5). This is because it is perhaps the most expansive example of such efforts. Indeed, in any serious discussion about traditional and vernacular architecture in Nigeria, mention must necessarily be made of the three volume series, still a classic in Nigerian schools of architecture because it sets out to make known those architectural achievements of Nigerian architecture with which it was the author’s privilege to become acquainted with (Dmochowski, 1988). The author argues that unlike the arts such as carvings and bronze, “the roots of the nation’s building craft as well as the triumphs of Nigerian developed architecture should be made known and popularized” (Dmochowski 1988:10). The large survey, containing about one thousand six hundred precise measured drawings, apart from several thousand photographs, aimed to “provide future writers and present day readers in particular with the basic material for any further architectural research” (Dmochowski 1988:10). Extensive by nature, it documents salient aspects of traditional architecture of several Nigerian cultures, which had seldom been the focus of previous studies. These include cultures in the Riverine areas (the Igbo, Benin, Edo), Yoruba compounds and palaces, Hausa architecture, the domestic and religious buildings of peoples in North Central Nigeria. It also covers tribes around the Jos Plateau, which include the Nupe, Gwari, Nok, Tiv, Jaba and Jukun. Dmowchoski’s methodology, best described by Moughtin, was however, not based on a rigorous procedure of selection comprising of those “buildings which were of interest to him and to which he had easy access to” (Moughtin 1988b:59-60). Notwithstanding, Dmowchoski’s work provides valuable information about traditional buildings, their form, use and construction in many Nigerian communities (*Figures 2.5-14*). In this, Dmowchoski succeeds and does so admirably.

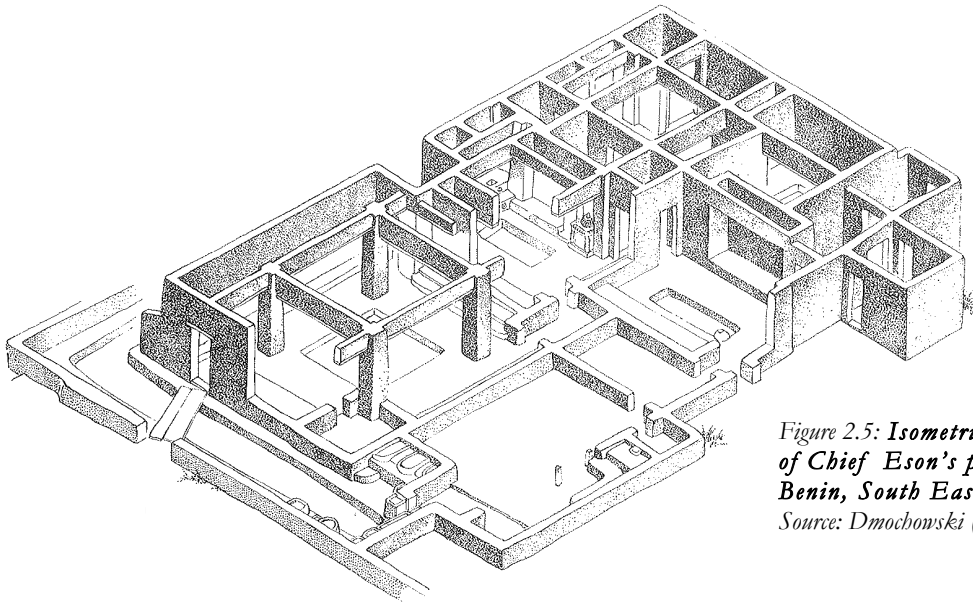


Figure 2.5: Isometric cut out of Chief Eson's palace in Benin, South East Nigeria
Source: Dmochowski (1988).

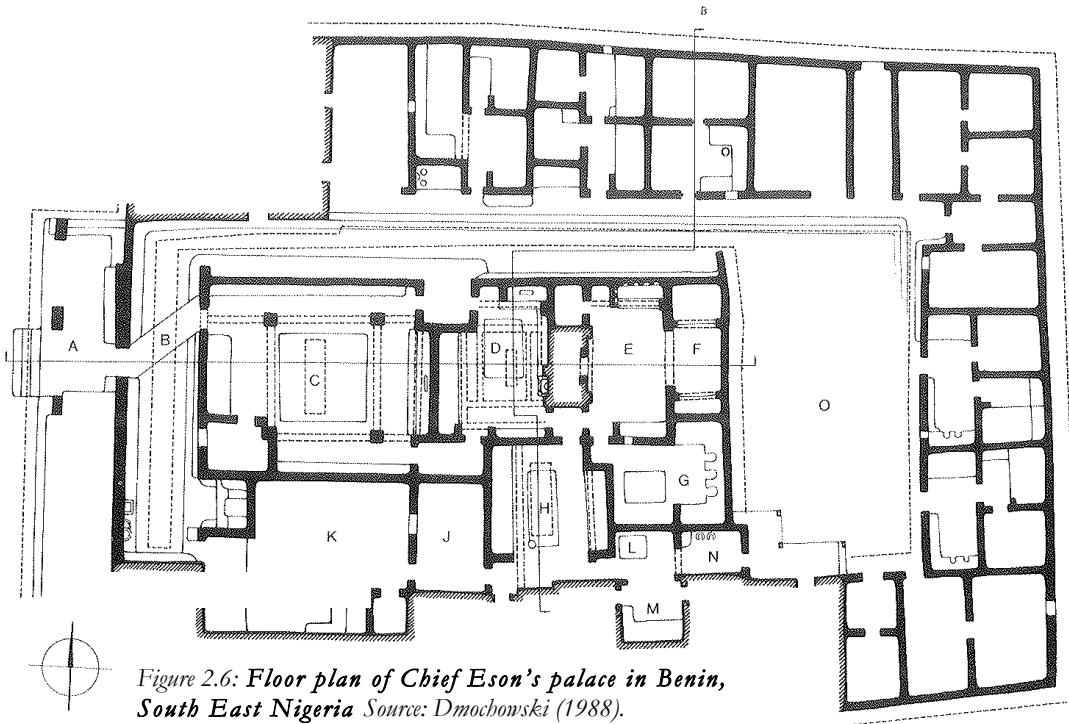


Figure 2.6: Floor plan of Chief Eson's palace in Benin, South East Nigeria
Source: Dmochowski (1988).

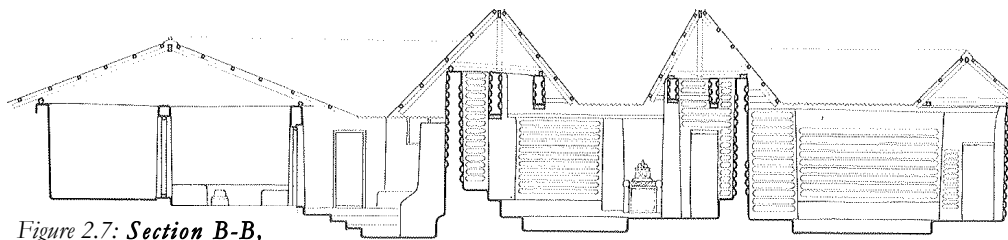
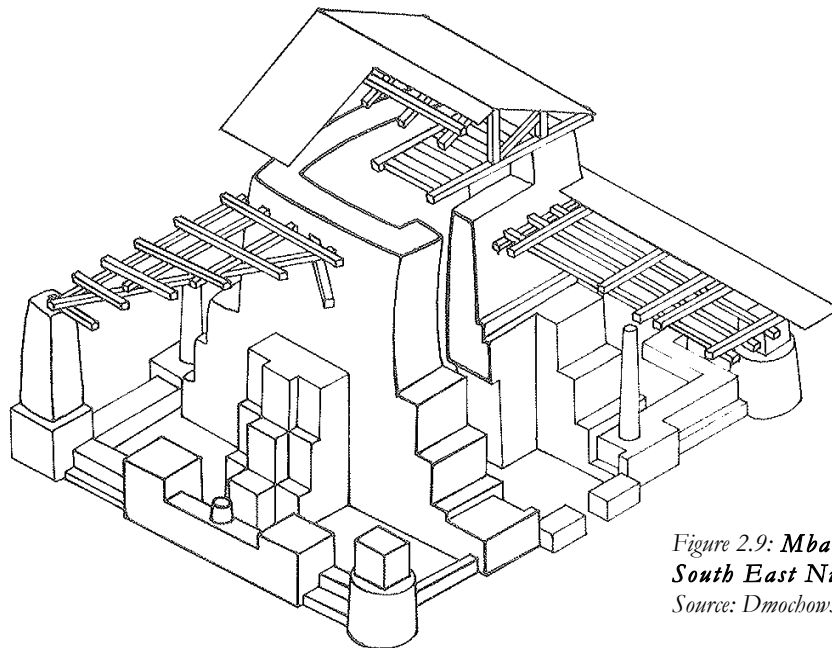
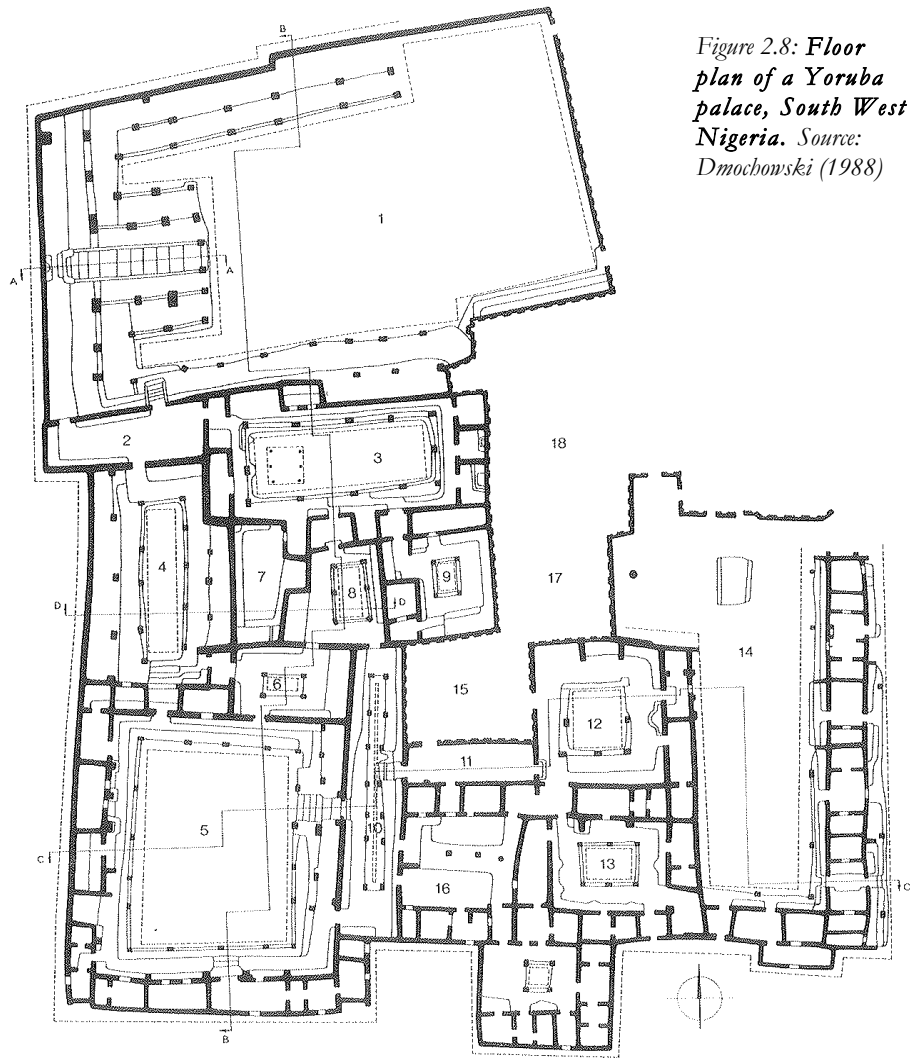


Figure 2.7: Section B-B, Chief Eson's palace, Benin . Source: Dmochowski (1988).



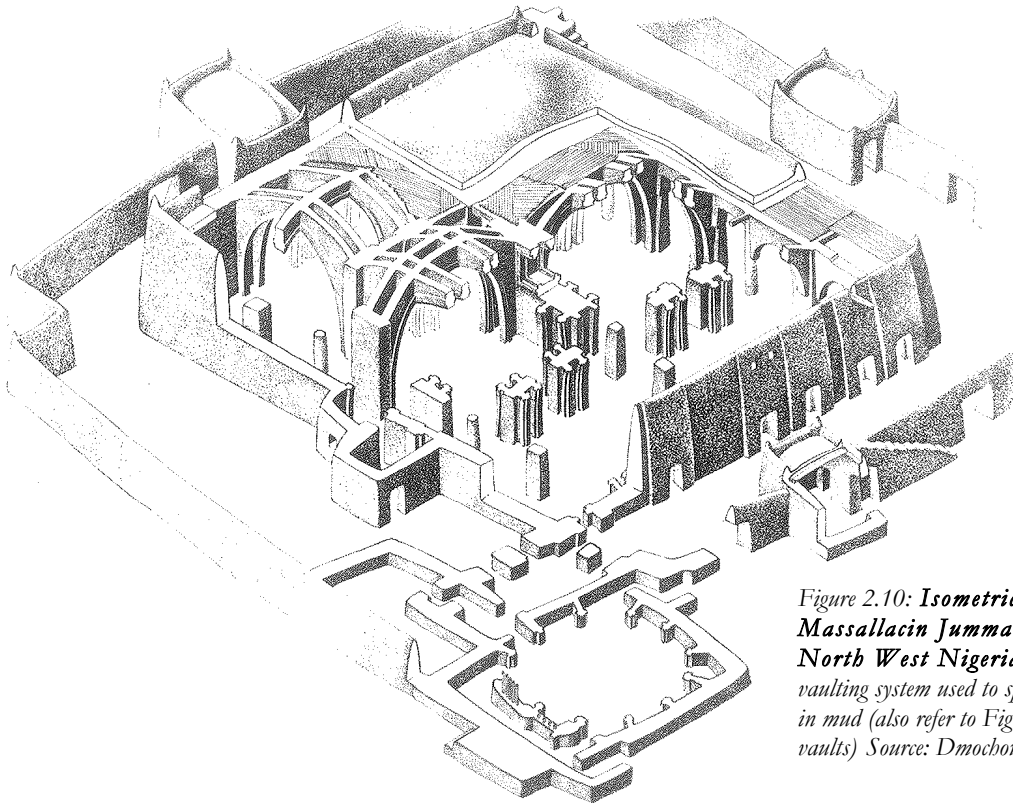


Figure 2.10: Isometric cutout, Massallacin Jumma'a, Zaria, North West Nigeria. Note the vaulting system used to span large spaces in mud (also refer to Fig 2.2 on Hausa vaults) Source: Dmochowski (1988)

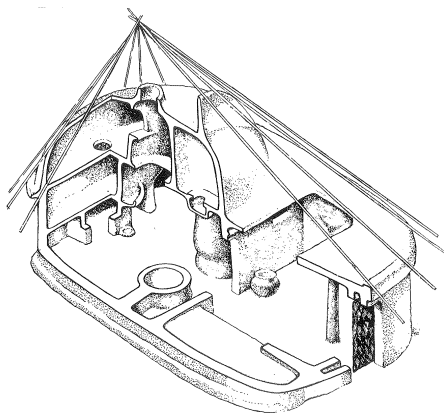


Figure 2.11: Isometric cut-out, Jaba dwelling, North Central Nigeria. Source: Dmochowski (1988)

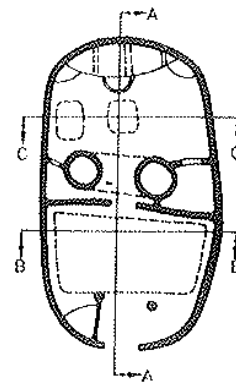


Figure 2.12: Floor plan, Jaba dwelling, North Central Nigeria. Source: Dmochowski (1988)

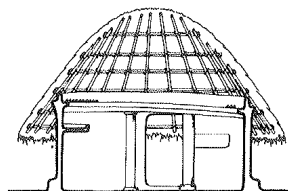


Figure 2.13: Section B-B, Jaba dwelling, North Central Nigeria. Source: Dmochowski (1988)

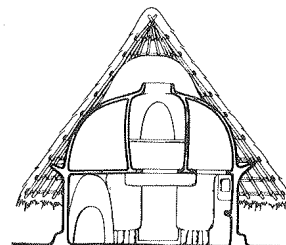


Figure 2.14: Section C-C, Jaba dwelling, North Central Nigeria. Source: Dmochowski (1988)

2.3 Prototype housing in Nigeria

Popoola's dissertation on the spatial formation of the housing environment in Hausa land arose from the observation that public housing schemes in Nigeria gave the impression that "inhabitants can be defined in terms of some numerical average that can be fitted into public housing environments" (Popoola 1984:31). *Plate 2.9* illustrates two or three storey housing blocks commonly found constructed in many estates to accommodate public servants in Nigerian cities and urban towns, supporting Popoola's claim. The study had four purposes. First, to reaffirm that man's relationship with his housing environment is a two-way interactive process in which man shapes the environment and the shaped environment influences man's behaviour within it. Secondly, to show that the spatial organization of houses in the traditional setting reflects the social relations and cultural values of its inhabitants. Thirdly, the study sought to explore the extent to which the spatial organization of public housing in Nigeria reflected the social relations and the cultural values of the inhabitants and fourthly, to suggest possible ways by which public housing can be made to reflect the social relations and cultural values of the users in a multi-dimensional society. In selecting the study area, the author chose Katsina due to its historical antecedents as one of the seven original Hausa states as well as being a traditional city whose residential environments were all within the city walls, the latter being a similar criteria in Schwertfeger's study¹². The methodology employed exploratory surveys with interview questionnaires, observation techniques and physical measurements. Popoola reports to have encountered a lot of difficulty in the physical measurement of compounds owing to two main factors. Previous measurements had resulted in demolitions by the government to make new roads. This created a phobia for any action perceived to harbour similar intent. Secondly, the Islamic purdah system widely practiced in the area allows only

¹² Refer to p. 27

close male relatives into the interior of compounds. Nonetheless, the study reports that traditional housing in Katsina revealed three features of the form making process. First, the Hausa house¹³ is a direct fulfilment of the inhabitants' felt needs, especially the social relations and cultural values (Popoola, 1984). Consequently, spatial patterns of *gidaje* and the social process of the people are interwoven. The *gida* also responds to changes in the domestic unit within it, thereby creating a good fit between the social structure of the inhabitants and its spatial organization. This confirms Schwertfeger's third finding about the flexibility of Hausa compounds in Zaria city¹⁴. Popoola's second finding relates to the one above. User control lies in the traditional housing process, as the family either designs and builds its own house or adjusts an inherited unit to meet its needs. In both cases, the decision-making power rests in the hands of the family. As such, "users did not try to meet all their anticipated needs at once in the form of a finished building" (Popoola 1984:440). The thorny issue of maintenance formed part of the process of reshaping the environment either in terms of finishes or the addition of units. Popoola notes the non-permanent nature of mud, the building material was largely responsible for building form as it could expand and contract as required. Comparing this to public housing provided in Kaduna, the state capital, the study found the policy of low cost housing for low income earners had not been achieved because estates actually accommodated middle and high income earners. The estates did not relate to family size and composition, nor did they reflect community units and structure (Popoola, 1984).

Popoola's research differs from aforementioned studies in this last finding- the comparison and establishment of the inadequacy of public housing in Nigeria as appropriate for effective housing delivery, thus linking theory to practice. This was re-iterated in a recent study of selected low-income public housing estates in Lagos, South West Nigeria. The study found that estates "no longer serve the

¹³ *Gida*, plural *gidaje*.

¹⁴ Refer to p. 28

original target group but had transformed even socially and economically to accommodate people of higher social and economical spectrum" (Aduwo 2011:274). Public housing units have however continued to be produced through Public Private Partnership schemes despite numerous calls from stakeholders to the contrary (NHP 2006, Popoola 1984, Matazu 2008, Onibukun 1990, Jinadu 2007, Adejumo 2009). Floor plans for such housing, which are often replicated across many sites are usually produced by architects as standardized prototypes (Plate 2.10, Figures 2.15-16). As this has become a strong political campaign strategy, research into various cultures need to be carried out if problems relating to the observed problems of prototype housing in the country are to be reduced.



Plate 2.9: Aerial view of public housing in urban cities of Nigeria. Source: Google images, July 2011



Plate 2.10: CAD generated view of a duplex by private developers. Source: Uroko, 2011



Figure 2.15: A two-bedroom prototype house plan used by a private developer for mass housing. Source: PPG brochure, 2011



Figure 2.16: Option 2 for a two-bedroom prototype house plan used by a private developer for mass housing. Source: PPG brochure, 2011

2.4 Studies on the search and synthesis for a national style

Following the discussion on prototype housing, studies began to emerge in the 1990's on the issue of evolving a national architectural style, corresponding to an era of massive infrastructural development with the relocation of Federal Government administration from Lagos to Abuja. Notable among these are the writings of Prucnal-Ogunsote (1993, 2002).

Prucnal-Ogunsote's research aimed at unravelling whether a Nigerian architectural style exists. The study was conducted with the aid of historical documentation supplemented by interviews with leading professional architects of the day discussing the philosophies behind their specific brand and style of architecture (Prucnal-Ogunsote, 2002)¹⁵. The author posits the strongest influence on Northern indigenous architecture was the introduction of Islam. This later developed into the North African style and eventually evolved into Sudanese architecture. In the South, the return of slaves from Brazil shaped architecture into a Brazilian trend while a historical style imported by the British developed into the European trend and later found expression as the Colonial style in both regions of the country. The Modern style followed, best expressed throughout Nigeria as the International style. This later evolved into the Pure and Late modern styles (*Figure 2.17*). "A combination of the Brazilian style in the South and Sudanese style in the North with the Colonial style in both regions produced a kind of vernacular regional architecture best expressed in private residences" Prucnal-Ogunsote (2002:7). The study goes beyond documentation in suggesting future styles made possible through analysis of precedents influenced by external examples, linking theory with practice in a study of vernacular architecture in Nigeria.

¹⁵ This paper is based in part on the author's dissertation, Prucnal-Ogunsote, B. (1993). *A study of Modern trends in some aspects of Nigerian Architecture*. Unpublished (Ph.D) thesis, Ahmadu Bello University, Zaria.

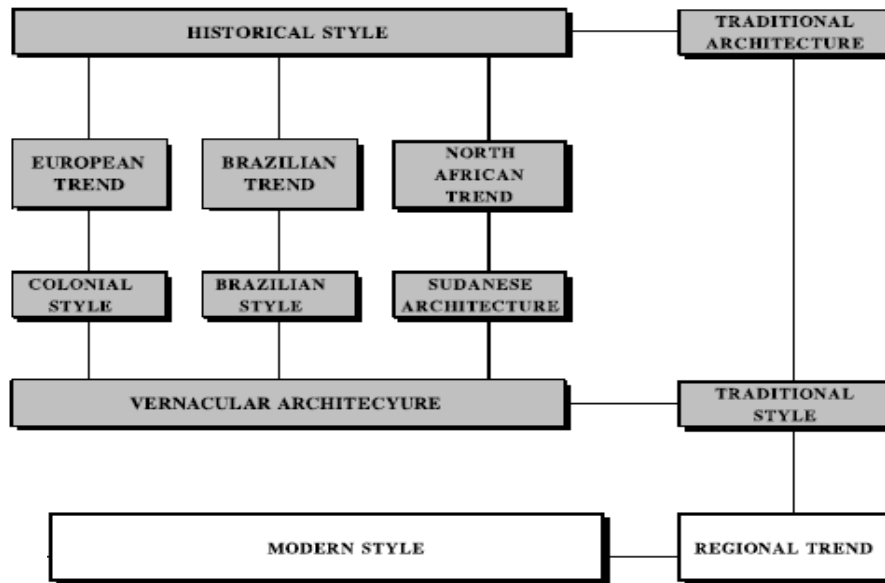


Figure 2.17: *Styles and trends in Nigerian vernacular architecture*. Source: Adapted from Prucnal-Ogunsote (2002)

Subsequently, the evolution of regional styles became the focus of more intensive culture specific studies in the various regions of the country such as the South West, South East, South South, North West and North Central regions. Most works reviewed hereunder focus on at least one culture in each of these regions.

Osasona, in examining the influence of British colonial architectural practices and the Afro-Brazilian style on the traditional architecture of the Southern part of Nigeria asserts that non-Africans, from non-architectural perspectives have mostly produced documents on African architecture. Consequently, they “seldom capture the socio-cultural and spatial import of indigenous built form” (Osasona 2007:2). The methodology employed ethnographical and historical materials in discussing traditional architecture of the three major ethnic groups in Nigeria namely Hausa, Yoruba and Igbo. Osasona posits that modifying influences of colonial administration and returning slaves from Brazil and Sierra Leone influenced the traditional architecture of Yoruba land in the South West, producing a vernacular version called the Brazilian style (Plate 2.11). Due to economical factors, a later modification was produced, called the Afro-Brazilian style (Plate 2.12). Osasona alludes that Nigerian traditional

architecture reveals a “preponderance towards prototypes depending on regional socio-cultural influences modified by the availability of modern building materials and climate” (Osasona 2007:21), re-echoing Ogunsoye’s findings. Osasona’s writings emotes obvious passion, but the interchangeable use of the terms Nigerian Architecture when referring to mainly architecture of the South West becomes confusing to the reader¹⁶. Notwithstanding, both authors assert that traditional architecture is that of a people existing before any external influence. Vernacular traditions consist of a hybrid form of architecture, which has been modified, accepted and sustained due to external influences, or what Osasona refers to as popular architecture (Plate 2.13).



Plate 2.11: **Brazilian influences on vernacular buildings-Ibadan.** Note the hipped corrugated iron roofs and wood framed windows. Source: www.everyculture.com



Plate 2.12: **Afro-Brazilian two-storey rooming house, Ile-Ife.** Source: Osasona 2008



Plate 2.13 **Chancellor's lodge, F.U.T. Akure, Vernacular traditions in modern buildings.** Source: Prucnal-Ogunsoye (n.d.)



Plate 2.14: **Brazilian influences on vernacular buildings-Akure.** Source: Odeyale et al (2010)

¹⁶ See *Popular Architecture*, Osasona (2009:7)

2.5 Regional styles and effects of urbanization

Oyedale, Sodagar and Temple (2010) examined the symbols, patterns and philosophical groundwork reflected in house form and local building material to unearth the rich metaphoric and cultural underpinnings in the Yoruba society. Employing case studies, interviews, structured questionnaires and documented historical data in Akure and Lagos, South West Nigeria, the paper reports that vernacular traditions in the study area were influenced by the Brazilian style (*Plate 2.14*). Returnee craftsmen trained in slavery as well as European models built by Colonial masters and Missionaries influenced this style (Oyedale, Sodagar and Temple, 2010). The authors assert this modified both interior and exterior designs, use of symbols and building materials in the region, expressed by both Prucnal-Ogunsote and Osasona. However, for a recent paper with a number of documented precedents¹⁷, one would expect a richer presentation of the subject matter. As is, the main issue linking Yoruba symbolism and how this is reflected in traditional forms was only discussed on page 11. This unfortunately undermined the substance of the paper.

Uduku's research on the urban fabric of Igbo architecture in South East Nigeria explored the extent to which local building traditions were retained within modern housing environments, which could be used to integrate old and new physical developments as well as interpret urban design in future. Employing ethnographic and historical data, Uduku asserts, "The post civil war¹⁸ period produced a unique rural and urban architectural history in Igbo land due to many factors-a traditional acephalous lifestyle" (Uduku 1996:192). It also encouraged the absence of a historical planning reference model and a slow urbanization

¹⁷ In the present review alone, eight studies directly bearing on Yoruba architecture have been discussed. These include Vlach (1976), Schwertdfeger (1982), Dmochowski (1988, 1990), Prucnal-Ogunsote (1993, 2002) and Osasona (2007, 2009). See also Oluyemi (1996) and Umoru-Oke (2010).

¹⁸ The Nigerian Civil War, also known as the Nigerian-Biafran War occurred between the 6th July 1967 and 15th January 1970. It was a political conflict caused by the attempted secession of the southeastern provinces of Nigeria as the self-proclaimed Republic of Biafra (Nigerian Civil War, 2013).

process due to the relative interior geographical location of Igbo land¹⁹. Subsequently, a style emerged which adapted modern standards of living to traditional values and outdoor spaces came to accommodate the hybrid lifestyle of neo-urban Igbo. Two trends were identified in the urban housing fabric. One leans towards the adoption of Western urban design and planning models in the formal sector whilst the second involves “use of indigenous design material and local planning measures by members of the informal sector” (Uduku 1996:198). The results of these findings would have been greatly enhanced by the use of illustrations and photographs. As is, the reader is unfortunately left to mentally construct graphical images of the argument as the discourse unfolds.

Ikebude’s research on identity in Igbo architecture makes easy reading for a rather complex and oft times difficult subject to understand-the Igbo culture. Ikebude’s thesis was that architecture is capable of expressing identity through its structure, appearance and location, providing useful information relating to the worldview and social status/balance of power within such a society (Ikebude, 2009). Specifically, the study sought to understand how buildings function as carriers of Igbo ontology and worldview distinct from the Western conception of architecture based on Vitruvian traditions. The methodology employed personal observation, ethnographic data and interviews. Ikebude’s findings are discussed hereunder.

Firstly, architecture was a major social and religious pre-occupation of the Igbo people before the advent of Europeans (*Plates 2.15-17*). It was a veritable means of identity. This is rooted in the traditional Igbo worldview-an organized religious belief in the spiritual, “expressed as power and prestige in two typologies, the *Ekwuru* and *Obi* structures” (Ikebude 2009:21-25, 78-82). Secondly, the advent of Colonialism and Missionaries at the turn of the 20th Century threatened this worldview. Architecture was once again used “to express political, administrative

¹⁹ See *Figure 1.1*

and religious power” (Ikebude 2009:62-69). Thirdly, by post independence, a hybrid model bearing elements of both traditional Igbo and the International style emerged, showcased in prominent institutional buildings, such as places of worship (Plate 2.18). This was followed by a revival of traditional architecture executed in modern materials patronized by the rise of wealthy citizenry in Post Civil war Igbo land. The significance of Ikebude’s research lies in the relationship between the worldview of the Igbo people and how it is expressed and modified through architecture. This perhaps is not a novel idea in architecture (Rapoport 1969, Kus and Raharijaona 1990). Its re-iteration from an art perspective in Nigeria however makes it noteworthy as it links theory with what is architecturally practiced in the region.



Plate 2.15: **Igbo traditional house.** Source: www.content.lib.washington.edu



Plate 2.16: **Igbo vernacular house.** Source: culture.chiamaka.com



Plate 2.17: **Mbari Igbo shrine house.** Source: www.content.lib.washington.edu



Plate 2.18: **Holy Ghost Cathedral, Enugu.** Note the European influence on a building that came to signify power. Source: Ikebude (2009)

A related study in the South South region is Mbina's research, which examined European influence on traditional house form in old Calabar and its environs. The study explored the settlement pattern and European impact on traditional house form of the Efik in Old Calabar to understand the effect of ethnic pluralism of the British Colonial masters. The author's hypothesis was that European contact with the Efik people was solely responsible for all that went wrong in the community (Mbina, 1999). The methodology employed ethnographic data, observation and documentation of some traditional and contemporary compounds in the area.

Mbina writes that firstly, traditional Efik architecture was basically a group of rooms and spaces organized around an open courtyard that served various functions including climate regulation in a hot and very humid environment (Figure 2.18). The courtyard also supported the day-to-day lifestyle and activities of extended families.

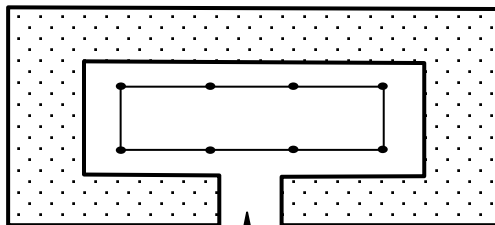


Figure 2.18: **Steps in breakdown of Efik traditional compounds.** The first stage shows the compound with rooms round a central courtyard. Source: Adapted from Mbina (1999)

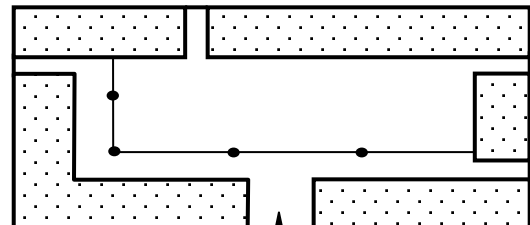


Figure 2.19: **Stage 2-beginning of breakdown at the perimeter.** Source: Adapted from Mbina (1999)

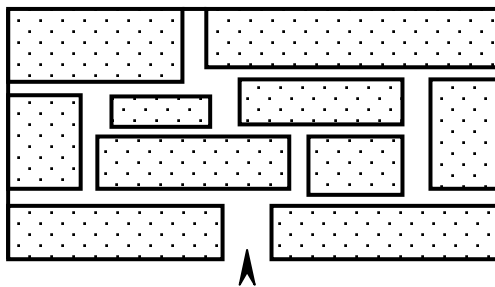


Figure 2.20: **Final stage-compound no longer exists.** Source: Adapted from Mbina (1999)

Secondly, due to the influence of external trading, urbanized Calabar domestic architecture consists of an imported wooden house. To accommodate the subsequent changing lifestyle, parts of the old compounds had to be disintegrated (*Figures 2.19-20*). Thirdly, in answering his hypothesis, factors associated with this change were two fold consisting direct and indirect factors. The former are identified as European contact, introduction of slave trade, Christianity, monogamy, European education and administration (Mbina, 1999). Indirect factors are identified as a decline in agriculture, trade, family economic interdependency, witchcraft, socio-cultural transformation, shift in status of old Calabar, aloofness and greed. The thesis concludes that the British were not solely responsible for all that went wrong with the culture, in contrast to its hypothesis. The Efik people also had their own part to play.

In *Changing urban housing form and organization in Nigeria*, Chokor analyses housing forms in some Nigerian cities, including cultural motifs and economical circumstances, which shaped their evolution over time (Chokor, 2005). The study contextually analysed historical changes in housing forms, their social meanings for inhabitants and implications for sustaining future urban design and planning. The methodology employed "a conceptual morphological model of housing zones comprising of the inner city core, the transitional housing belt and the suburban housing district" (Chokor 2005:71-73). This was used alongside ethnographic data, historical documents, drawings and photographs, similar to Vlach's approach²⁰. Chokor writes that an urban sense of community was lost to socio-economic factors induced by colonial, post-colonial capitalist forces and suburbanization processes. This finding supports similar observations made in many of the works reviewed in this chapter. In Yoruba land, this was evidenced by transformations in housing typologies from compound houses through tenement structures and the European style bungalow, corresponding to

²⁰ See p. 26

the three morphological zones. Chokor also posits negative images are associated with traditional housing forms owing to physical degeneration while colonial infrastructural investment and planning favoured suburban enclaves.

2.6 Contemporary housing studies on socio-cultural factors, spatial morphology and urban transformation patterns

In Northern Nigeria, no culture has been the focus of such intense research in architecture as the Hausa society. A minimum of six doctorate researches have been dedicated fully or in part to this²¹. There may well be more. A major factor lending credence to this assertion is that "Hausa architecture displays the canonical requirements of monumentality, commodity and permanence" (Saad 1987:435, see *Plate 2.19*). Of particular interest to this review is Muhammad Oumar's study of the socio-cultural morphology of Hausa living spaces. Oumar's research focuses on Hausa domestic architecture, which has been "largely sidelined if not totally ignored most especially in academia" (Muhammad Oumar 1997:33). The study attempts to address this imbalance as well as establish the basic characteristics and dominant spatial themes of Hausa domestic architecture. This was done under the premise that a strong relationship exists between the spatial organization of Hausa architecture and the social life of its inhabitants (*Plate 2.20*). The methodology employed extensive surveys of 160 houses within the walled city of Kano to document the social, economical, spatial and physical properties of the compounds and their inhabitants. These are presented in the form of plans, photographs, tables and statistical summaries. Space syntax analyses were then used to quantitatively establish existing cultural

²¹ Schwertdfeger (1975), Saad (1981), Popoola (1984), Muhammad Oumar (1997), Ahmed (2007) and Kabir (2009). Other books and publications about Hausa architecture include Daldy (1948) Folye (1951), Smith (1952), Mabogunje (1968), Saad (1985, 1986), Moughtin (1985), Marchand (1993) etc. Materials on traditional architecture which cover the Hausa culture include Dmowchoski (1988, 1990) discussed in this review and also some conference proceedings of INTBAU (International Network for Traditional Building, Architecture and Urbanism) www.intbau.org/ni/academia/252-nigeria 2013.html

genotypes as well as the basic character of Hausa domestic architecture. Muhammad Oumar's findings are itemized below.

First, the basic characteristics of Hausa domestic architecture, based on the spatial analysis of the social, configurational and physical aspects had to be flexible enough to accommodate the physical growth of the family. This finding correlates with Schwertfeger and Popoola's findings in other Hausa cities²². The author asserts Hausa houses contain a minimum of three spaces-the *zaure*, courtyard and *daki* together with a function specific service space the *bandaki* or toilet. These "constitute what may spatially be termed universals . . . in simple terms, no house is fully constituted if any one of these spaces is missing" (Muhammad Oumar 1997:246). Other spaces that complete the ensemblage of *gidaje* include the *kofar gida*, *rumfa* and *dakin girki*²³. Secondly and syntactically, houses surveyed fell into two basic inequality genotypes, "one commonly found in the smaller single family houses and the other associated with socially big and larger houses" (Muhammad Oumar 1997:247). Thirdly, in answering the hypothesis, Hausa domestic architecture as represented by the study supported the socio-cultural set-up of Hausa society. The study also found that three things constitute the cultural determinants of spatial form in the Hausa house. These include the discrete demarcation of physical spaces, a strong bias towards diurnal gender restriction and exclusivity in quotidian and non-kindred use of space via control of social space accessibility.

The strength of Muhammad Oumar's study lies in the vigorous nature of the space syntax analysis. The author however admits that these were sometimes copious and complex to be comprehended easily. It thus comes as a surprise that the conclusions proffer no clear ways in which the results could be of practical use. Notwithstanding, the research sheds valuable light on ways to justify

²² Refer to p. 28-29 and p. 35 respectively.

²³ Forecourt, entrance hut or room and kitchen respectively.

qualitative research using scientific and verifiable quantitative analysis, the lack that previously dominated this kind of scholarship as illustrated by this review.



Plate 2.19: **Entrance porch, Emir's Palace, Kano.** Note the monumental size of the portal, typical of Hausa palaces. Source: hausa-aminus3.com



Plate 2.20: **Kofar Na'isa, Kano.** Note part of the ancient city wall on the left. Source: hausa-aminus3.com

Hausa society has not been the only culture intensely studied in Northern Nigeria. Recently, research on housing transformations owing to informal urbanism in suburbs of the FCT, Abuja in North Central Nigeria emerged focusing on the changing patterns of use and structure over a period of three decades between 1976 and 2006. The study aimed to establish factors responsible for changes in housing patterns observed in traditional Gbagyi environments and its modern day communities (Mai and Shamsuddin 2007). Historic, ethnographic and interview records were triangulated with information obtained from case studies, photographs and drawings of compounds. Four themes of transformation obtained from the literature were employed in the analysis. These were cultural, behavioural, spatial and socio-economical. The study concludes that first, due to globalization, traditional Gbagyi culture was subjected to myriad changes threatening the identity of the community. Secondly, the character of the traditional compound is such that huts are arranged round a central granary surrounded by a built up mud wall (*Figure 2.21*). Thirdly, four themes of transformation were detected in the community. These are conversion of spaces for guests and rooms adjacent to streets converted into bedrooms and shops for

rent (socio-economical), extension of dwellings to meet increased family needs (spatial), modification of spaces that cater to the socio-cultural demands of privacy and face lifting as a status symbol (behavioural). *Plate 2.21* illustrates a contemporary house in Abuja displaying most of these trends. Finally, the community's response to urbanization culminated in the secularization of lifestyles evidenced by the loss of peripheral customs. However, core cultural values of securing the nuclear family and use of compounds have been retained (Mai and Shamsuddin, 2007). Subsequent studies by the authors highlight similar findings by comparing transformation patterns in Abuja, Nigeria and Dhakar, Bangladesh (Mai and Shamsuddin 2008, Mai and Rahman 2010).

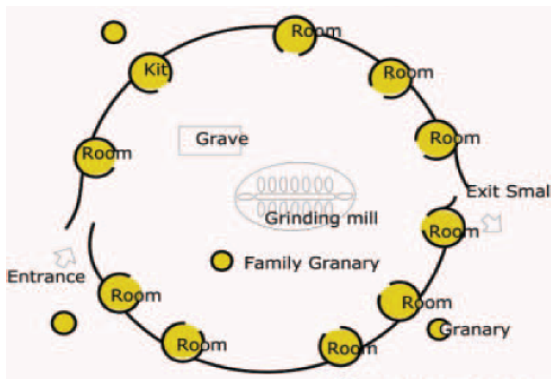


Figure 2.21: *Traditional Gbagyi courtyard.*
Source: Mai & Shamsuddin (2008)



Plate 2.21: *A contemporary house, common in the FCT-Abuja and other urban cities in Nigeria.* Source: haus.aminus3.com

2.7 The nature of vernacular architecture studies in Nigeria

The foregoing discussion on studies of vernacular studies in Nigeria highlights the progressive nature of this kind of research in four stages from being largely exploratory at the onset to becoming more specific both in the physical area covered and methodological approaches employed. The documentation of many salient aspects of West African and Nigerian culture in the first two categories celebrates the rich variety of forms and materiality of vernacular architecture in many communities, distinct from western constructs. This constitutes the first stage of progression in this regard, illustrated in the

writings of Prussin (1974, 2002), Denyer (1978), Schwertfeger (1982), Moughtin (1985) and Dmowchoski (1990). Vlach (1976) however focused on a particular culture, the Yoruba, with the findings linked to general theories of architecture.

Subsequent studies on prototype housing and the search/synthesis for a national style, influenced by government intervention in response to the increasing need for housing and public sector administration after independence, diverge from this approach of documentation and exploration. This constitutes the second stage of vernacular study progression in Nigeria. Popoola's study on the inadequacy of public housing to support the lifestyle of the target populace took the findings garnered from studying vernacular architecture found in Katsina a step further in comparing salient features of space use, construction techniques and materiality with prototype housing in the then state capital, Kaduna. This diversion from mainstream documentation of vernacular traditions is also reflected in studies aimed at discovering styles of architecture prevalent in architecture at a time of large scale and massive infrastructural development embarked upon by the Federal Government in relocating the administrative headquarters of Nigeria from Lagos to the more central Federal Capital Territory, Abuja (Prucnal-Ogunsote 1993, 2002). The strength of studies in stage two lies in consciously linking theory to architectural practice in part to address practical problems related to housing and design concerns in the country.

Stage three is largely influenced by findings from previous studies that the expression of styles in Nigerian vernacular architecture is regional in nature (Prucnal-Ogunsote, 2007). Consequently, the evolution of regional styles in the then three major regions of the country became the focus of several studies (Uduku 1996, Mbina 1999, Chokor 2005, Osasona 2007, Ikebude 2009). Survey instruments employed for many of the studies in stages two and three only differ from those in stage one in terms of approach, research aims, cultures studied and a narrower scope in physical areas covered.

Contemporary housing studies, the fourth and last stage of vernacular studies in Nigeria takes the scope of research from regional levels to specific cultures (Muhammad Oumar 1997, Mai and Shamsuddin 2007, Mai and Rahman 2010). Such studies frequently analyse community structures and spatial organisation in order to establish existing trends in the vernacular housing characteristics of a community or culture. Interdisciplinary methods from anthropology, sociology, behavioural studies and architecture are often triangulated to establish more objective results in this last stage. Methods relating to ethnography, use of historic documents, interviews, physical documentation of measured compounds, sketches, photographs, mapping and space syntax analyses feature in such studies. The link between theory and practice, previously muted in several studies from the third stage however needs to be re-asserted in future analysis of contemporary vernacular architecture studies. Whilst this does not in any way undermine valuable contributions and advancements made to the study of Nigerian vernacular architecture, it does present an area for future improvement. This is especially pertinent in an era of multiple social and housing problems facing an increasing Nigerian populace.

Conclusion

The literature reviewed in this chapter revealed that most studies on Nigerian vernacular architecture were conducted in well-documented language groups in the South West, South East, North West and North Central regions, with little research conducted in the North East. Additionally, a progressive trend was observed in the studies characterised by a narrowed scope in the physical area covered to the use of methods in allied fields of the built environment. Furthermore, the link between research findings and architectural practice needs to be asserted for studies addressing contemporary housing problems. As presented in the latter part of the review, interdisciplinary methods are frequently employed in addressing housing problems in traditional communities. This is the focus of the next chapter, Approaches to the study of Vernacular Architecture.

CHAPTER THREE

CHAPTER THREE: **APPROACHES TO THE STUDY OF VERNACULAR ARCHITECTURE**

Summary

The last chapter reviewed literature on Nigerian vernacular architecture, concluding that future studies need to improve on interdisciplinary methodologies that adequately link theory to practice. This chapter presents various approaches from Anthropology, Sociology and Behavioural research, concluding with a discussion of space syntax analysis from Architecture.

In broad terms it can be argued that research in vernacular architecture stems either from the study of buildings as artifacts or from the study of cultures that produce them (Oliver 1997, Asquith 2006a). For vernacular architecture studied as artifacts, these usually take the form of studies of spatial types and physical boundaries that frame the spaces as frequently obtained in archaeology²⁴ or cultural and behavioural codes that determine the way space is used. The latter belong to anthropology, sociology and architecture²⁵. Combining both approaches is beneficial in order to unearth holistic ways in which a vernacular tradition can be sustained. This necessitates an interdisciplinary methodology, involving methods employed in the allied disciplines of the built environment as suggested by several authors (Dawson 2008, Dumreicher 2008, Salama 2007, Nadia 2007, Asquith 2006a, Lawrence 2006, Asquith and Vellinga 2006, Rapoport 2006, 1990, Vila et al. 2003, Lawrence and Low 1990, Kent 1990a, Sanders 1990, Hanson 1998). In dealing with domestic and residential environments, Asquith (2006b) identifies four approaches to the study of space. These include anthropological, sociological, behavioural and architectural approaches. While methods employed in these approaches may not all directly bear on the present study, they holistically contribute to discussions on the methodology to be adopted and subsequent research findings to follow.

²⁴ Examples of such studies are Funari and Zarankin (2003), Robb (2007).

²⁵ An example in this category is a study by Kus and Raharijaona (1990).

3.1 Anthropological approaches

Anthropology, the scientific study of the origin and behaviour of man, including the development of societies and cultures is concerned with issues of the built environment since the first formation of theories of cultural evolution during the 19th Century (Emery, 2011). Anthropological approaches basically seek to explain how purposefully built environments contribute to the maintenance of the society as a whole by accommodating and expressing social organization, social structure and the like. To this broad end, Lawrence and Low (1990) discuss four theoretical approaches to research in anthropology concerning the built environment. These are the 'fit' of a societal group to its built form (social organization), the built environment as a representation of culture (symbolic approaches), the societal production of built form (social production of built form) and built form as an extension of the individual (psychological studies). This last category overlaps with behavioural approaches suggested by Asquith (2006b) and is discussed under sub-section 3.2.

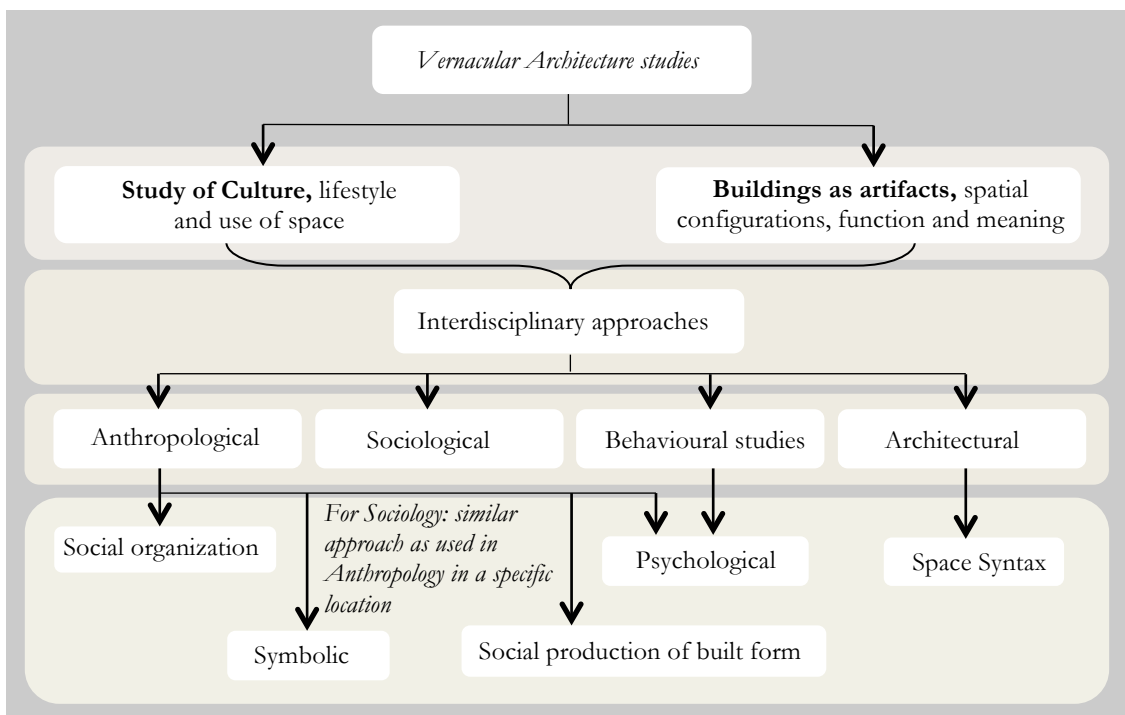


Figure 3.1: Framework for Vernacular Architecture studies

3.1.1 Social organization

Lawrence and Low (1990) note that although theoretically fragmented, a significant body of literature has examined questions regarding interactions of the built environment with social organization and spatial behaviour. Some authors take their thinking in the lines of Lewis Henry Morgan's assertion that "the form of the primitive dwelling is a direct expression of the organization of the cooperating kin that occupied it" (Lawrence and Low 1990:460). Such studies generally focus on the fit or congruence of forms and how they correspond to social organization of a culture. Underlying this is the suggestion that human groups seek to adapt buildings to their behavioural needs or functional requirements. Most of the studies on Hausa architecture discussed in the foregoing chapter fall into this category. Both Popoola and Muhammad Oumar for example, sought to ascertain the extent to which Hausa architecture was a reflection of the socio-cultural set-up of the Hausa people²⁶. Closely related to this are ethnographic studies which examine relationships between the larger social system and dwelling forms through household processes. An example is Schwerdfeger's study discussed on pp. 27-29. "In focusing on kinship, on the developmental cycle and on economic and gender relations, these studies seek to explain household relations with the built environment as embedded in larger social processes that cut across individual domestic units" (Lawrence and Low 1990:464). Analyses in such studies focus on how and why people manipulate the built environment to suit social needs and desires, and how the environment in turn enhances or inhibits such behaviour. In truth, most of the studies reviewed in the preceding chapter display elements of the fit theory, with links to symbolic meaning, normative structure and ideological processes.

²⁶ Refer to p. 35, 45-46

While there is no doubt that ethnographic studies have contributed to our understanding of social organization, economic systems, the built environment and dwelling form, “they lack the theoretical development of approaches in symbolic processes and social production” (Lawrence and Low 1990:465). Combining these methods proffers more robust results.

3.1.2 Symbolic approaches

Symbolic approaches deal with meanings of form and interpret the built environment as an expression of culturally shared mental structures and processes (Lawrence and Low, 1990). They investigate what built environments mean as expressed through salient aspects of form, often in native worldview. Ikebude’s research on how Igbo buildings in South East Nigeria function as carriers of Igbo ontology and worldview is an example of this kind of study, discussed on p. 41-42. They are particularly helpful in explaining intangible features of cultural processes. These include social symbolic accounts, structuralism, metaphoric/mnemonic approaches, theories of ritual and phenomenology.

Social symbolic studies consider the built environment as a direct reflection of social or political structures, where “built forms and site plans act as communicative or mnemonic devices expressing or reaffirming through symbolic associations relations between groups, or positions held by individuals within a culture’s framework” (Lawrence and Low 1990:466). The arrangement of sites and organization of their meanings correspond to social structure. Vlach’s study on Yoruba culture²⁷ or Kuper’s study on the language of site and politics of space illustrate this. “There exists a condensation of values in special sites . . . transactions that constitute the totality of social life may be spatially mapped with sites expressing relatively durable social structure” (Kuper 1972:411).

²⁷ Refer to p. 26

Structuralism, the idea of underlying rules, seems to be by far the most developed theoretical approach to in the symbolic analysis of the built environment. "Structuralist approaches postulate an underlying unconscious mental structure that is realized in myriad socio-cultural manifestations" (Lawrence and Low 1990:467). The classical theories of Claude Levi-Strauss attest to this. Levi-Strauss postulates the existence of a structured collective unconscious capable of generating a pattern of cultural behaviours including built forms and unconscious mental structures comprised of binary oppositions representing universal characteristics of human thought. Critics have argued that such views are static and synchronic, failing to account for social historical changes and that the logic of connections and operations is never made clear (Lawrence and Low, 1990). Pierre Bourdieu's theories seem to bridge this gap in structuralist thinking with his concept of *Habitus*, which is a system of dispositions that includes not only a way of being but also a result of an organizing action. Lawrence and Low (1990) note that by focusing on the spatial dimension of action, Bourdieu makes his most significant contribution to the understanding of human interactions with the built environment, connecting social theory with space and time. Henry Glassie's survey on the combination of geometric spaces in household architecture lead him to conclude that "formal geometries rather than environmental or behavioural needs guided design and development" (Glassie in Lawrence and Low 1990:470), introducing the concept of spatial configurations into structuralist theory.

The use of metaphor in symbolic analysis of the built environment is one the most powerful and successful approaches in anthropological studies. Metaphoric and mnemonic approaches, agued by proponents like James Fenandez call for the primacy of metaphor as a cultural expression

as "it is through metaphors that humans argue over the appropriateness of rules, plans and world views, creating order in the universe" (Lawrence and Low 1990:472). These relate built forms to the cosmos, human body or some mythology.

Phenomenological approaches stress the importance of multiple subjective sensory experiences that link physical features with personal identity. This approach often is seen as being abstract, subject to varying meanings and belonging to the realm of tacit, and not implicit knowledge.

3.1.3 Social production of built form

Theories on how societies produce built form tend to focus on social, political and economic forces that produce the built environment and the impact of the environment on social action with an emphasis on urban phenomena, institutional forces and changing historical and socio-cultural contexts within which built form exists (Lawrence and Low, 1990). Examples of such studies relate urban development and resettlement, social history, political economy of space especially in Colonial settlements to patterns of power and space with social actions of individuals. Mai and Shamsuddin's research on housing transformation of the Gbagyi culture around Abuja, the Nigerian capital due to economic and institutional forces falls within this category of approaches.

Studies in urban development and resettlement illustrate how housing and planning may have little to do with the needs and desires of the people, architects or planners but are largely dependent on external administrative socio-political processes. The discussion on mass housing and its related social problems on pp. 34-36 is an example. Social history on the other hand deals with building types as social and cultural products. Anthony King (in Lawrence and Low, 1990) observed that as society changes, new buildings emerge while others go obsolete. Society produces

buildings that maintain or reinforce its social forms. In a similar vein, Michael Foucault's theories which focus on building typologies and power in the society illustrate how architecture as an institution contributes to the maintenance of power of one group over another and functions as a mechanism for coding their reciprocal relationships at a level that includes the movement of the body in space as well as its surveillance (Lawrence and Low, 1990). Theories in social history and building types bring to fore issues of diachronic perspectives, which many of the other theories lack.

Studies on the political economy of space generally analyze the role class, gender, race and culture plays in the production of built forms. This is illustrated by impacts of Colonial occupation by British, French, Spanish, Dutch and American forces on their respective colonies. Such studies also deal with building prototypes/urban planning with a focus on new typologies, spaces, social and economical responses of locals formed as a result of these influences. Prucnal-Ogunsote's study on regional styles due to external influences of colonial masters in Nigeria falls within this category.

The theory of structuration owes a lot to Giddens' argument that space must be incorporated into social theory. Herein lies the link between theorists like Giddens (structuration), Bourdieu (structuralism) and Foucault (social history)-the conscious synergy of social structure and human behaviour and action (Lawrence and Low, 1990). However, these studies benefit greatly by integrating insights from symbolic and psychological approaches.

3.2 Behavioural Approaches

Studies based on behavioural approaches focus on the micro level of individual responses, attitudes, mental processes and sometimes feelings to and in the built environment. Examples exist in proxemics, spatial dimensions of behaviour and environmental psychology, which are concepts linked to the architectural discourse.

Proxemics generally refers to research on human use of space modulated by culture. It is "the study of how man unconsciously structures micro space-the distance between men in the conduct of daily transactions, the organization of space in his houses and buildings and ultimately the layout of his towns" (Hall 1963:1003). Hall proposes four general kinds of personal spaces ranging from intimate to public and his works have been a foundation for subsequent studies especially in cross cultural use of space.

On the other hand, spatial dimensions of behaviour explore how the built environment may enable or constrain behaviour i.e. people of certain cultures may seek high density settings, bringing issues of privacy and territoriality into spatial studies, the different meanings and levels of privacy and how control is exercised in territorial realms. Both bear on architecture at the individual level.

Environmental psychology takes a holistic view of changing relations among psychological and environmental factors with the person in the environment being the unit of analysis. Such studies involve comparisons between psychological and physical features especially in home environments and the regulation of behaviour through dialectical oppositions of identity and community, openness and closeness (Lawrence and Low, 1990).

3.3 Sociological Approaches

Sociology is the study of the origin, development, and structure of human societies and the behaviour of individual people and groups in society (Microsoft Encarta, 2009). Sociologists generally approach the subject of space use in relation to family structure, norms and values and the effect that the family has on the way space is constructed in and around the home (Asquith, 2006b). In this respect, many of these theories and concepts overlap with theories in anthropology. A major difference is the context of the particular research, as the approach to be adopted will depend on whether the focus is on relations at the level of an individual, family unit or that of an entire community or culture.

3.4 Techniques employed in anthropological, behavioural and sociological approaches

Studies based on anthropological, behavioural and sociological approaches frequently rely on a combination of techniques and methods, many of which are carried out simultaneously during ethnographic fieldwork. Ethnography "is the work of describing a culture. The essential core of this activity aims to understand another way of life from the native point of view" (Spradley, 1979:3). It also frequently refers to the written product of ethnographic research. Conducting field work involves taking field notes, conducting interviews, observing activities, photography, collection of artifacts, translating manuscripts, sketching, drawing or even video taping events. Field notes are "fairly detailed summaries of events and behaviour and the researcher's initial reflections on them. The notes need to specify key dimensions of whatever is observed or heard" (Bryman 2012:447). These could be in the form of mental notes recalled from times when writing would be considered inappropriate or jotted notes made to jog one's memory for use in preparing full field and detailed notes, the researcher's main data source written comprehensively as soon as possible. Field notes are frequently utilized in

conjunction with interview transcripts from informants, who are more than respondents answering a series of questions. An informant in this regard is the teacher and individual “who transforms the anthropologist from a tourist to an ethnographer . . . who has acquired a repertoire of cultural behaviour” (Spradley and McCurdy 2012:4). This is the main difference between interviews conducted in sociology and those conducted in anthropology, the language used to formulate the questions. “Survey research with respondents almost always employs the language of the social scientist . . . Ethnographic research, on the other hand, depends more fully on the language of the informant. The questions arise out of the informant’s culture” (Spradley 1979:31). Social survey data generated from respondents are useful in conveying important information, which are often quantitative in nature such as demographics and other forms of statistics. Ethnographic surveys elicit cultural descriptions from the native point of view. Both are important for holistic studies of the built environment²⁸.

Another important technique employed in these approaches is participant observation to record what is observed or heard by others in the field or natural setting. It is possible to carry on a casual informal interview while doing participant observation. Observers generally enter a field or setting in a covert or overt role (Bryman, 2012). Observers act covertly when they do not disclose their identity as researchers. This is frequently done to ease problems relating to access in closed non-public settings such as organisations. In overt roles, people in the setting are aware of the researcher’s presence, usually in open public settings. Varying degrees of both roles could occur under different situations and circumstances. The level of participation the researcher adopts will depend on several factors-the setting, access, research questions and aims, time, finances available etc. Each role has its advantages as well as its risks.

²⁸ I later employed information obtained from an ethnographic survey with those from a structured interview questionnaire. These are discussed in more detail in Chapters Five and Six.

The use of photographs and videos as part of documentation can also aid in adding depth and perspective to research in the built environment. A picture captures a scene in ways that words may not. It also serves as a visible reminder of a scene or setting which can later be transcribed into other forms of communication such as narratives, drawings or sketches. A thorny issue with visual records is however the ethical consideration by many research bodies over the degree of preserving informant identity and confidentiality as a photograph or video recording can be used to link information to its source²⁹.

Other sources of data employed in anthropological, behavioural and sociological approaches are personal documents, manuscripts and media reports. Such documents include letters, diaries, autobiographies, newspapers, and magazines, which were not produced through the efforts of the researcher but are “simply out there waiting to be assembled and analysed” (Bryman 2012:543). Whilst presenting a veritable source of data and valuable information often original in nature, such documents can be difficult to find, are often tied down with issues regarding copyrights or even difficult to interpret or decipher. Official documents are especially prone to bureaucratic processes in this regard. In assessing the quality of such documents, Scott (1990) suggests four criteria, which include authenticity, of genuine unquestionable origin; credible and error free as well as representative of the typical data in that field whilst being clear and comprehensive in meaning.

Conducting research in allied fields of the built environment as discussed above can seem complex especially when different methods and techniques are involved. The main critique of such methods, generally categorized under qualitative research, is that they are subjective, difficult to replicate, present problems of generalization and lack transparency (Bryman, 2012). Qualitative research is often criticised as being too impressionistic, subject to the

²⁹ This turned out to be the case for the present study. See *Appendix 2*, Information sheet for participants and consent forms. Informant identities were therefore disguised in reporting the ethnography in Chapter Five.

researcher's understanding and translation of data. Furthermore, replicability is difficult under the circumstances most qualitative studies are conducted. "Precisely because it is unstructured and often reliant upon the qualitative researcher's ingenuity, it is almost impossible to conduct a true replication, since there are hardly any standard procedures to be followed" (Bryman 2012:405). The problem of generalization is another criticism levelled at qualitative research. Because such studies are conducted in a specific setting within a given timeframe, it is difficult for the results to be generalized. Closely related to this is the issue of lack of transparency, especially the exact procedures and steps taken to achieve the results emanating from the research. These problems notwithstanding, such methods provide rich data and a holistic view into the intricate relationships between built forms and their inhabitants. This is illustrated in Esber's study, *Designing Apache homes for Apaches* where anthropologist George Esber argued for a restoration of the missing sense of self and home for the *Dilje* tribe. Former housing schemes, which had proved inadequate and sometimes sub-standard were still being pursued through policies for re-housing Native Americans in Anglo style housing. "The goal of the Payson project was to correct this problem by honoring Indian self-determination with respect to the home and community design for a new Tonto Apache camp" (Esber 1987:187-188). Esber first mapped out the entire settlement, locating all the structures and identifying the occupants of each house with the aid of drawings. Interviews were conducted to establish the relationships between people in different households and to document how space was defined and used. The additional use of photographs, participant observation, ethnographic and ethno-historical materials provided a wealth of information that was later compared with modern day living standards to identify continuing practices as well as changing ones. This procedure unearthed many features of the Apache cultural lifestyle that were important determinants of design such as the matrilineal pattern of family lineage which to a

large extent determined house location and neighbours. The most important division of space in a house separated the sleeping area from the remaining larger space used for daytime activities and observation. The cooking area needed to be a part of this open space to accord a full view of people to assess each other's behaviours (Esber, 1987).

Esber's research³⁰ highlights the benefits of anthropologists, architects and urban planners working with communities targeted as beneficiaries of government funded housing projects. The anthropological input also proved to be an important facet in the design process. "The cross cultural nature of the design project placed different demands on the architect and though aware of these, he lacked the necessary knowledge for data collection . . . training in the anthropological field methods" (Esber 1987:195).

Similarly, a multidisciplinary mix of approaches was employed to design and propose a policy-oriented synthesis of the often disparate contributions from design, policy and public health literature to address the on going significant needs of indigenous people in Australia (Fien et al. 2008). The synthesized information from the literature reviewed was then grounded and tested through fieldwork in three case study communities. The aim was to develop a "flexible framework to assist policy makers and built environment professionals to respond to calls for suitable low-cost housing options for indigenous housing in remote regions of Australia" (Fien et al. 2008:2). Results from extensive interviews with residents, local government officials and housing officers as well as observation of space use in Mimili, Maningrida and Palm Island identified significant issues and problems closely related to a lack of concern for core cultural values, inappropriate planning, lack of functionality and fit between internal and external spaces, as well as ineffective management of the housing process (Fien et al.

³⁰ Also see Esber (1977) *The study of space in advocacy, planning with the Tonto Apaches of Payson, Arizona*. Unpublished thesis (Ph.D), University of Michigan, Ann Arbor.

2008). These findings were instrumental in developing a framework based on six sustainable key issues-cultural appropriateness of future housing designs to core cultural values, preferences and range of household types, sizes and aspirations; eco-efficiency in terms of energy, materials and waste management; healthy living practices, employment opportunities and economic development; life cycle costing and innovation in procurement, ownership and construction systems.

These studies highlight the benefits of employing interdisciplinary methods in order to address housing problems in different communities. It also underscores the need to educate and engage architects in interdisciplinary studies as advocated by numerous authors (Oliver 2003, 2006a, Rapoport 2006, Lawrence 2006, Asquith 2006, Latter 2006, Dawson 2008, Salama and Alshuwaikhat 2010). The next section discusses methodologies developed from architectural approaches to studies in the built environment. In contrast to the methods described in the foregoing sections, these are quantitative in nature.

3.5 Architectural Approaches

"Architectural approaches to the study of housing are primarily typological, concentrating on the physical form and structure and how architectural styles have evolved through time" (Asquith 2006b:2). It has also been noted that though often overlooked as a built form by the architectural profession because it is so familiar, the house is one of the most complex of buildings (Hanson, 1998). Space is studied either as a design or theoretical discipline in architecture and herein lays the dialectic especially as it applies to practice. "It is not enough to be satisfied with only identifying similarities in the spatial patterning of a set of houses in a particular region or cultural context" (Asquith 2006b:3). It is vitally important to understand and interpret the hidden order underlying those patterns and typologies. Unfortunately, architecture as a discipline has relied on other professions for an appropriate theoretical base (Marcus 2002, Hillier 2007,

Salama 2007, Rittleman 2010). This is especially true in housing studies (Kemeny 1987, O'Neill 2008, Stegell et al. 2001). Rapoport notes that this lack of theory necessitates the need to always begin with the basics instead of "launching right into substantive issues, and thus advancing the field" (Rapoport 1998:2).

Hillier notes that architectural theories in the last two decades have generally suffered from two debilitating weaknesses—they have been "strongly normative and weakly analytic" and "secondly, the historic tendency to form architectural theories out of ideas and concepts borrowed from other disciplines" (Hillier 2007:2). It is out of this concern to develop an appropriate theoretical framework to effectively analyse architecture based on spatial configuration approaches of structuralism that Hillier and Hanson (1984) proposed the idea of space syntax, which has over the years been used to analyse both individual buildings, settlements, communities and cities.

3.6 Space syntax analysis

Space syntax emerged out of the concern to develop an appropriate theoretical framework for the study of space in architecture. Its origins as a research method date back to the 1970s at the University of London where syntactic analytical techniques were used by Hillier and Hanson (1984) in *The Social Logic of Space* to explore the relationships between social behaviour and space. Hunter (2010) notes that Hillier's work followed Thiel who coded patterns of behaviour and perception, devising a notational system describing the elements defining space, their relational patterns and spatial connections.

Space syntax is basically "a method for measuring space and identifying patterns in space use . . . based on the assumption that order in space originates in social life" (Asquith 2006b:4). Hillier asserts that space is the primary means by which the ascent from building as cultural transmission to architecture as theoretical intent is made. "In general, the form-function relation in buildings and

cities passes through the structural properties of whole configurations" (Hillier 1998:37). In essence, space is the mediator between form and function. Space syntax attempts to quantify the interrelationship between the built environment and social life (Ratti 2004). Hillier posits space syntax "sets out from the idea that the most powerful evidence for spatiality must be in the ways in which human beings actually organize and arrange real space" (Hillier 2005:4). It attempts to bring to the conscious level and make explicit underlying ideas inherent in space inhabited by people.

As a theory, Space Syntax is a set of analytical methods about space built on two ideas or theorems. These are the generative, which deals with linear spaces of circulation and movement and the reproductive, which deals with component spaces of building types in relation to the reproduction of social life (Hillier 2007, Psarra 2009, Hunter 2010).

The theorem of the generative is based on the premise that a building or urban area carries movement within and between all spaces it contains. Hillier (2005) observes that movement is essentially a linear activity. People interact in convex spaces and as they move, they experience the built environment through changing visual fields. Its basic elements are the axial line of movement and the convex space. It then follows that spaces directly connected to every other space in a complex will have a higher density of movement. In other words, "more direct universal accessibility implies a higher probability that a space will be used for movement" (Peponis and Wineman 2002:271). Spatially, the characteristics of any building layout or settlement can be described in three ways through "its axial or one-dimensional organisation, its convex or two-dimensional organisation and in terms of its isovists or visual fields" (Hanson 1998:39). These are illustrated in *Figure 3.2*. Axial lines have been frequently employed to analyse urban layouts or streets (Ratti, 2004) while convex spaces are frequently employed to analyse architectural floor plans of houses. Isovists or visual fields show the

maximum axial extension of a space in accessing or concealing parts of the building through views. It is often used to further analyse axial or convex layouts.

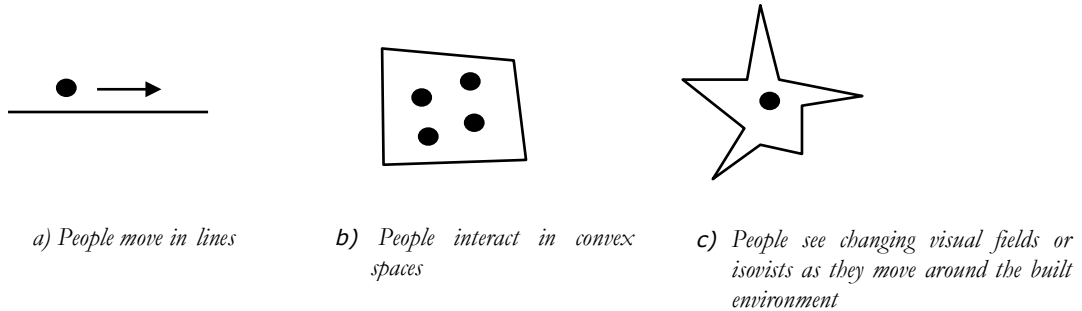


Figure 3.2: *Space, an intrinsic aspect of activity and not just a background for it.* Adapted from Hillier (2005).

The second theorem, that of reproduction is based on the notion “that human space is not just about the properties of individual spaces, but about the interrelations between the many spaces that make up the spatial layout of the building or a city as a whole” (Hillier 2005:5). This applies to common components of building types defined by activity, social rule and function. These patterns of relationships are intuitively known in a cultural setting, although they may vary from one design to another. This would then be reflected in their spatial configurations and used to infer cultural genotypes existing in the community.

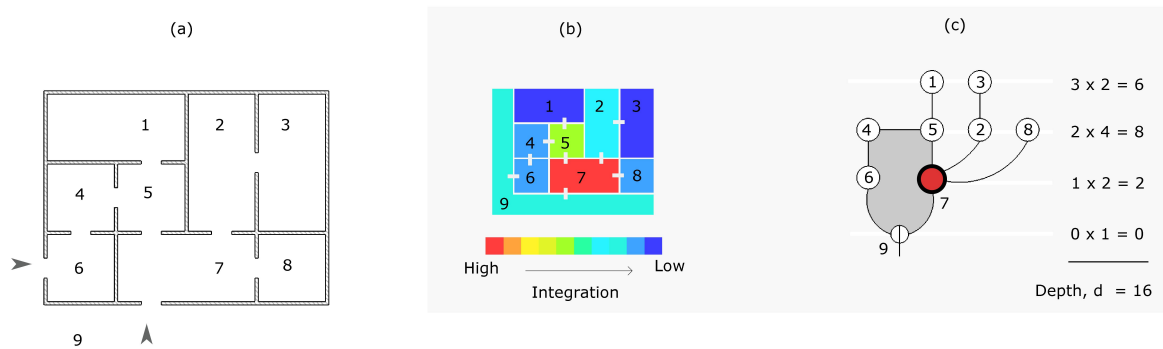
3.6.1 Methods of analysis

a) Justified Permeability Graphs (JPGs)

One of the approaches of space syntax is the Justified Permeability Graph (JPG) method, which examines patterns of connections between nodes or vertices and edges or lines. This analysis is used to interrogate the social structure of space (Ostwald, 2011). Because architectural floor plans are represented as convex spaces, this section primarily focuses on the analysis of convex plans.

A convex plan is usually constructed from the architectural layout of the complex, which is then converted into a graph displaying nodes or

rooms and lines or connections³¹. The first step involves analysing the graph to “uncover a range of qualitative properties of the spatial structure, including relative depth, control or permeability” (Ostwald 2011:226). All spaces in a convex map or pictorial representation of the plan or layout of the building are numbered. A bubble like graph showing the line of accessibility and relative depth from each space is then produced from the graph³². Spaces of equal depth from the root node are then placed on a horizontal line and multiplied by the number of spaces in each step. These are added up to give the total depth, d . Figure 3.3 illustrates this procedure, using the outside (numbered 9) as the carrier space or root node.

Figure 3.3: **House X** (a) Floor plan

(b) Convex map

(c) JPG of space No 9 as the root node

Secondly, the JPG may be subjected to mathematical analysis to produce a set of values describing the graph from the Mean Depth (MD), Relative Asymmetry (RA), Real Relative Asymmetry (RRA), Integration Values (IVs) and the Difference Factor, H^* (Hillier and Hanson 1984, Hanson 1998, Osman and Suliman 1994, Bafna 2003).

³¹ See Figure 3.3

³² Figures 3.3a and 3.3c

b) Mean Depth (MD)

The mean depth is given by $\frac{\underline{d}}{k-1}$ (where \underline{d} is the total depth of all the spaces and k is the total number of spaces in the complex. For *Figure 3.3*, $\underline{d}=16$, $k= 9$)

$$MD = \frac{16}{9-1} = 2$$

c) Relative Asymmetry (RA)

RA is the MD expressed as "a fraction of the maximum possible range of depth values for any node in the graph with the same number of nodes as the system" (Bafna 2003:25). It is given by

$$RA = 2 \frac{(MD - 1)}{(k - 1)} = 2 \frac{(2 - 1)}{(9 - 1)} = 0.2857$$

d) Real Relative Asymmetry (RRA)

RRA is a ratio of the RA values of the nodes of a given system and the RA values of the central node of an idealized diamond-shaped graph with the same number of nodes as the system (Dawson, 2008). It is obtained by the algorithm:

$$RRA = \frac{RA}{D \text{ value for idealized } k \text{ spaces} *} = \frac{0.2857}{0.317} = 0.901$$

(*Hillier & Hanson 1984:112. D value for 9 spaces=0.317)

e) Integration Value (IV)

The IV is a numerical figure calculated for each space in a complex as a reflection of the extent to which that space integrates or organizes movement and access and by implication social network and activity within the complex (Hillier, Hanson and Graham 1987, Hanson 1998, Ratti 2004, Batty 2004, Hillier 2007, Mustafa 2010, Jeong and Ban 2011a, 2011b). It is calculated as the inverse of the RRA. The higher this value, the more integrated that space will be in a complex or floor plan. Spaces with a high

level of social function and activity in a complex tend to have corresponding high IVs. In this example for space 9, the IV is given as

$$IV = \frac{1}{RRA} = \frac{1}{0.901} = 1.108$$

Using this set of calculations, IVs for all spaces in House X were calculated and presented in *Table 3.1*. From the figures, space 7 has the highest IV. This is easily the space that allows most access and movement on the floor plan.

Table 3.1: Syntactic values, House X

k-space	MD	RA	RRA	IV	IV 2sf
1	2.625	0.464	1.466	0.682	0.68
2	2.125	0.321	1.015	0.986	0.99
3	3	0.571	1.803	0.554	0.55
4	2.25	0.357	1.127	0.887	0.89
5	1.75	0.214	0.676	1.478	1.48
6	2.375	0.393	1.24	0.806	0.81
7	1.5	0.143	0.451	2.218	2.22
8	2.375	0.393	1.24	0.806	0.81
9	2	0.286	0.901	1.109	1.11(<i>Fig 3.3</i>)
Max	3	0.571	1.803	2.22	2.22
Mean	2.22	0.349	1.101	1.058	1.01
Min	1.5	0.143	0.451	0.554	0.55

Similar values were obtained using Depthmap™ v.10 software, developed at UCL for calculating IVs. These are illustrated in the figures below.

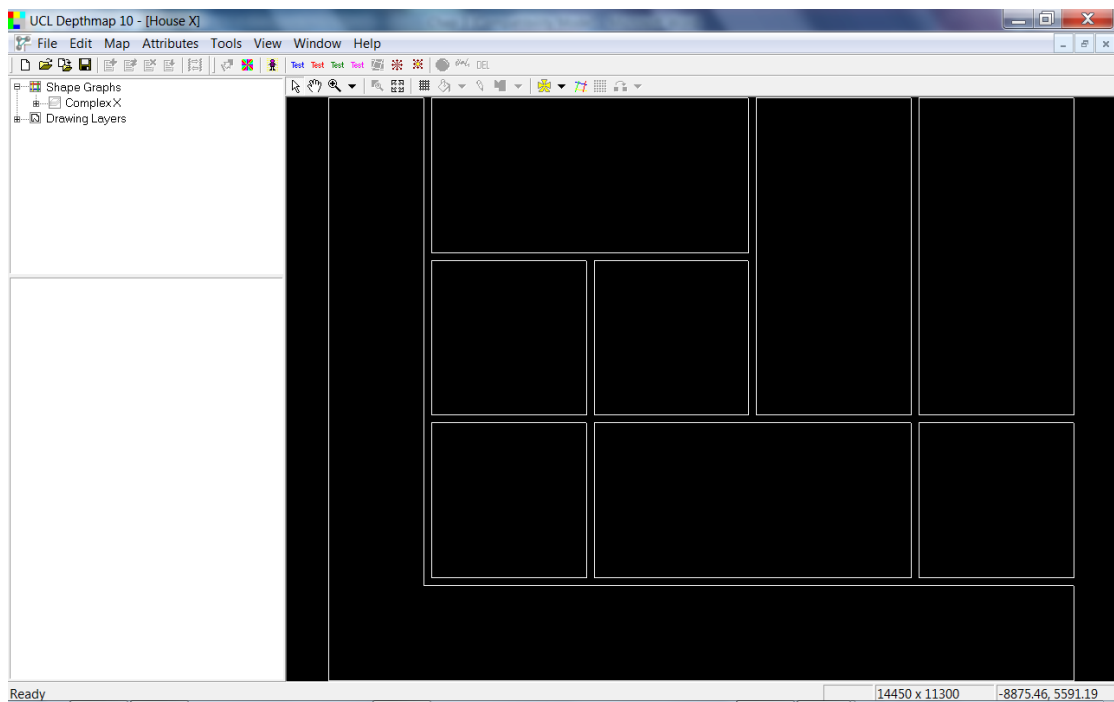


Figure 3.4: Importing the plan into Depthmap

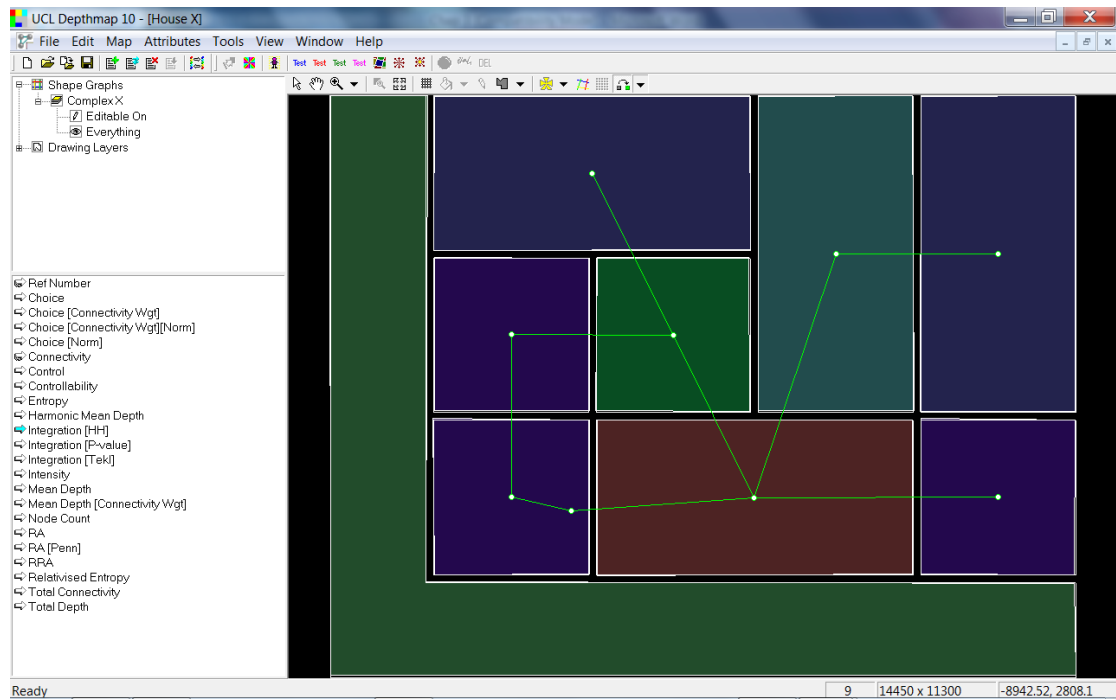


Figure 3.5: *Creating, linking and analysing the convex map*

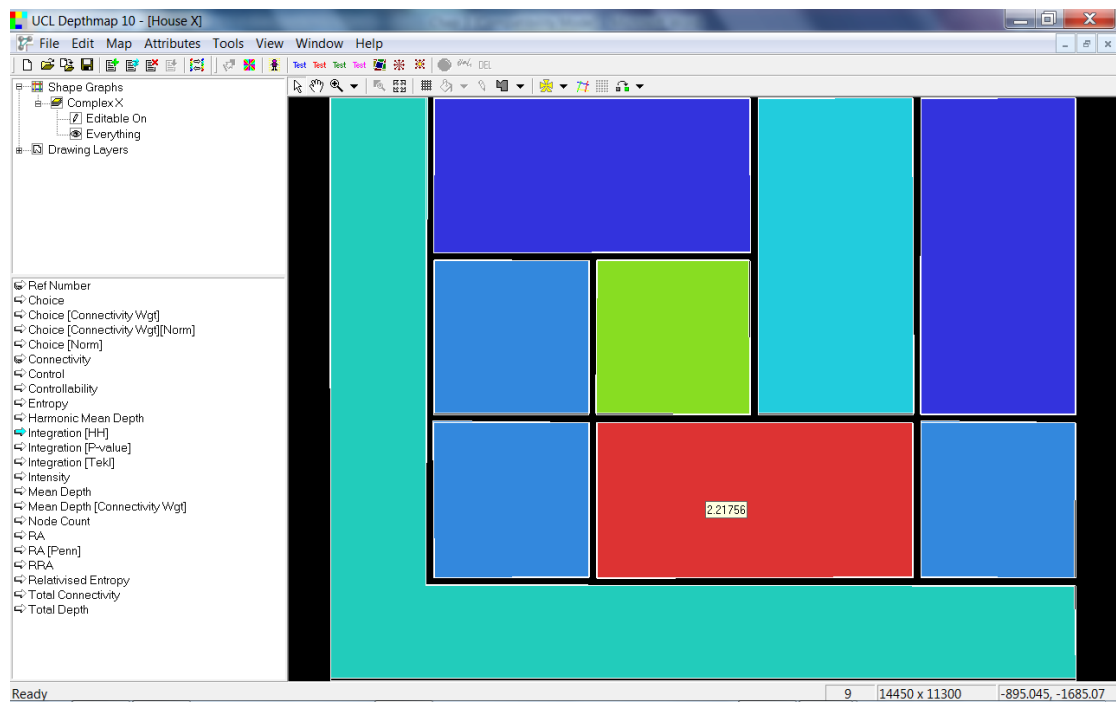


Figure 3.6: *Computing integration values*

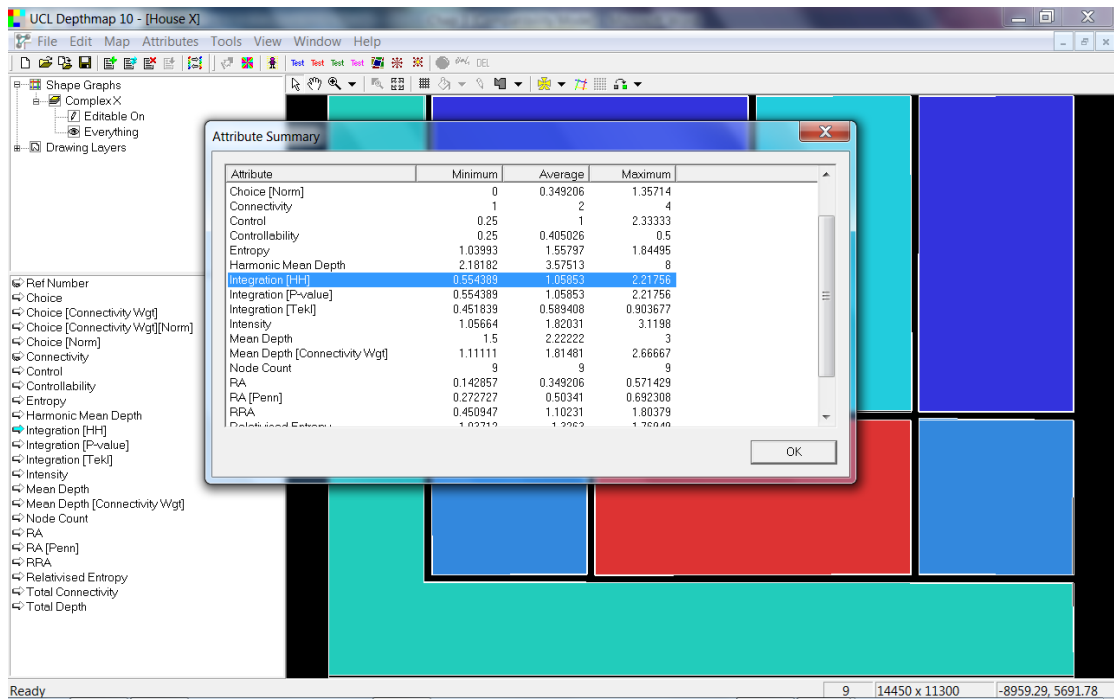


Figure 3.7: *Computing other syntactic data (RA, RRA etc)*

f) Difference factor (H^*)

In most cases, IVs will differ for different spaces in a complex as illustrated above. This is one way social and cultural relations are expressed through space. "If these numerical differences in functions are in a consistent order, then a cultural pattern exists, one that can be detected in things, rather than just in the way it is interpreted by minds" (Zako 2006:67). For comparative purposes, results from houses in a community can then be combined to see if a set of genotypes exists within the sample using the difference factor (Hillier et al. 1987, Hanson 1998, Ostwald 2011). The inequality genotype is described "not as a given rank order of labelled spaces, but a statistically stable pattern of variation of those" (Bafna 2001:20.9). It is a way of representing a consistent pattern of configurations by which culture is built into a spatial layout. Hanson (1998) describes the use of this method in suggesting a strong spatial genotype for Tallensi domestic space. Although other methods have been

developed to compare the properties of graphs³³, the inequality genotype remains the most common (Ostwald, 2011). The measure is given by the equations:

$$H = - \left[\frac{a}{t} \ln \left(\frac{a}{t} \right) \right] + \left[\frac{b}{t} \ln \left(\frac{b}{t} \right) \right] + \left[\frac{c}{t} \ln \left(\frac{c}{t} \right) \right] \quad H^* = \frac{H - \ln 2}{\ln 3 - \ln 2}$$

where H^* is the difference factor calculated for each house or layout using the minimum, mean and maximum RRA values obtained from JPG analysis.

From Table 3.1,

a=Min RRA value, 0.45;

b=Mean RRA value, 1.102

c=Max RRA value, 1.803

t=3.355 (i.e. 0.45+1.102+1.803)

$$H = - \left[\frac{0.45}{3.355} \ln(0.13412) \right] + \left[\frac{1.102}{3.355} \ln(0.328412) \right] + \left[\frac{1.803}{3.355} \ln(0.537406) \right]$$

$$H = 0.968875853$$

$$H^* = \frac{0.968875853 - 0.693}{1.0986 - 0.693} = \frac{0.275875853}{0.4055} = 0.68$$

Table 3.2: H^* values, step depth and space link ratio, House X

House X	RRA			DF (H^*)	Least IV		Most IV		**Space/link ratio
	Min	Mean	Max		Rm no	*SD	Rm no	SD	
	0.45	1.10	1.80	0.68	3	3	7	1	1.11

*SD: Step depth refers the number of steps from the outside to the space with least or most integration value

**Space/link ratio: is the number of links plus one divided by the number of spaces. A tree like JPG will have a value of 1 while values greater than 1 indicate the degree of 'ringiness' (or forming rings) in the complex (Hilier, Hanson & Graham 1986).

If there are other houses with H^* values of say 0.66, 0.68 and 0.67, then it can be inferred that a cultural genotype likely exists within the sample. In other words, there is evidence of a consistent or stable variation of spaces within the houses. This organization likely reflects a cultural code within the houses.

³³ See Dalton Conroy and Kirsan (2008) for example.

3.6.2 Integration and inference to social life

Using integration values and the functions of spaces, Hillier and Hanson (1984) argue it is possible to identify the social fabric of the community that inhabits it. *Figure. 3.8* is the layout of a farmhouse used as an example³⁴. Hillier (2005:7) explains “the *salle commune*, the space of everyday living and reception of informal visitors, is the most integrated internal space”. It lies on all rings of circulation, so that if absent, the layout becomes virtually a single sequence of spaces. Analysing a group of similar layouts within the same area in this way elicited the existence of a cultural genotype.

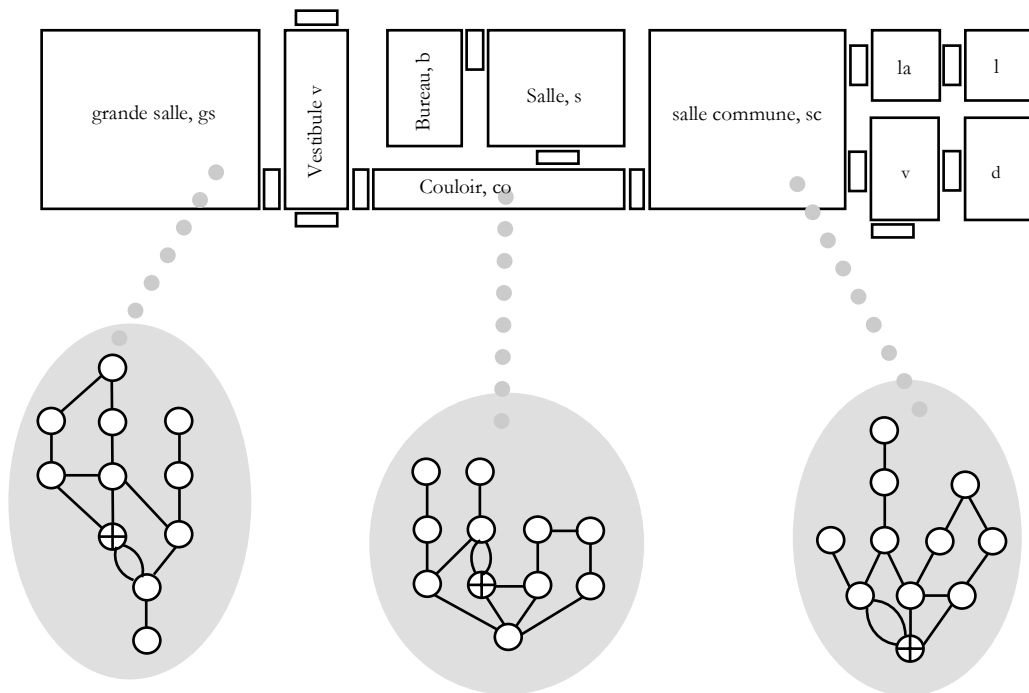


Figure 3.8: Layout of a farmhouse showing different configurations and integration values depending on the space one is viewing the plan from. Adapted from Hillier 2005; Hanson 1998; Hillier, Hanson and Graham 1987

³⁴ Hillier 2005, Hanson 1998, Hillier, Hanson and Graham 1987.

Combining this information with possible functions of spaces, the authors suggest that the layouts may have been organized around gender roles. Hillier (2005) asserts that culture is what happens naturally to us and the way to reproduce it is to embed it in everyday life.

This suggestion of the possibility of eliciting intangible social life and culture from tangible forms or layout of a house has perhaps been the most criticized aspects of space syntax. Asquith (2006b:12) posits “the danger in using space syntax to this degree is that there is the attempt to assign meaning to a set of spatial patterns particularly when the spatial type is as familiar as the family home”. Osman and Suliman (1994), with reference to Lawrence (1990) and Leach (1978), note that without knowing the facts, a 2D floor plan is an insufficient source for inferring social dimensions of societies. “Thus to pursue the study of cultural content of buildings by the mere analysis of its configuration is quite unreasonable” (Osman and Suliman 1994:199). Both authors argue that the method fails to adequately take into consideration the real 3D urban fabric, making it less convincing to predict movement. Even Hillier (1993) admits that configurational analysis of urban space is difficult for two reasons. First, urban spaces are continuous, with no obvious divisions into elements. Secondly, urban spaces are irregular except in obvious cases.

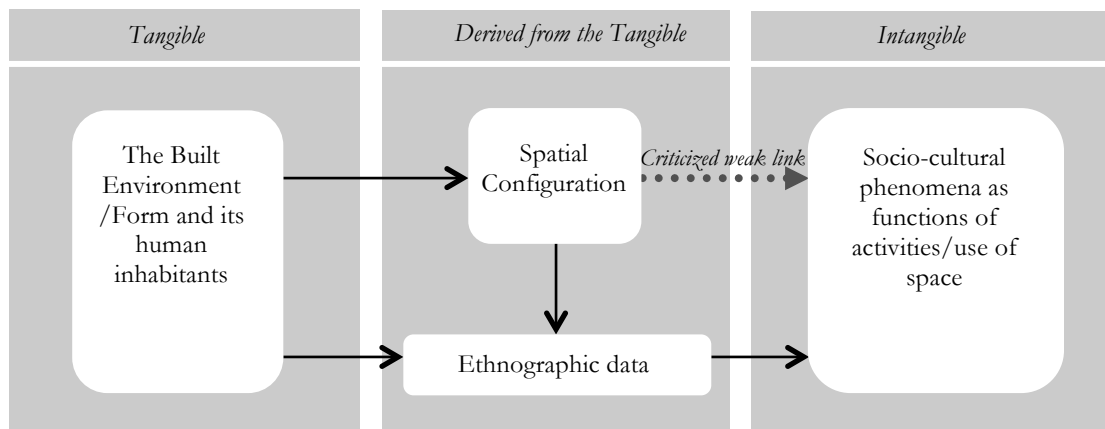


Figure 3.9: *The relationship between the tangible and intangible elements in socio-cultural housing studies*

Modifications to software designed to calculate IVs thus seem geared towards improving urban analysis and axial analysis even though some are specific to convex spaces and buildings, especially domestic houses. Osman and Suliman (1994) for example observed some discrepancies in integration values generated by space syntax programmes in non-western houses. This is largely based on the fact that in non-western cultures where open spaces such as courtyards form part of the functional areas of a house, the exterior would technically be a public space, usually a street, which cannot be used in establishing IVs. A problem is also likely to arise in areas where open plans are the norm and functions are not physically demarcated. These are nonetheless considered valid separate spaces³⁵. To tackle such cases, various methods have been devised over the years to modify and strengthen the procedure. These range from using other means to represent the justified graph and further development of software in order to cater to these and similar problems (Osman and Suliman 1994, Jeong and Ban 2011a, 2011b).

3.6.3 Space syntax applications

Space syntax has since been used to “understand how existing cities, urban areas and buildings work, and to simulate the likely effect of new interventions and help integrate information about other socio-economic factors into the design and planning process” (Hunter 2010:1). It has been extensively employed for research in architecture, urban planning and archaeology.

In architecture, the method has been used to reveal hidden design barriers in older spatial layouts like the redesign of Trafalgar Square in London and the Old Market Square in Nottingham (Hillier, 2007). It was

³⁵ For example the Betsileo house, Madagascar (Kus and Raharijaona, 1990)

also employed in integrating new and additional spaces in re-designing Tate building (Hillier, 2005) and the British museum (Dursun, 2007). Hanson (1998) demonstrates its use in analyzing domestic houses ranging from Bedouin tents, Tallensi and Ashante compounds in Africa and a sample of large English houses from 1590-1865, considered antecedents of the Palladian era. Similarly, Tahar (2004) established relationships between the structuring of space, spatial patterns and the system of social relations in Berber housing, Algeria. Space syntax has also been utilized in unearthing the underlying order in works of notable architects like Rietveld, Mario Botta, Richard Meier, John Hejduk, Adolf Loos, John Soane and Glenn Murcutt (Hanson 1999, Psarra 2009, Koch 2010, Ostwald 2011). Mustafa, Hassan and Baper (2010) used the analysis to detect privacy in traditional and modern house layouts in Iraq. Most recently, Jeong and Ban (2011a, 2011b) developed a programme incorporating space syntax algorithms with CAD and BIM (Building Information Management) software. This will help architects “find an appropriate purpose of each space for sustainable built environment on the basis of the spatial and social relationships in buildings or urban systems” (Jeong and Ban 2011b:1).

In urban planning, space syntax methods have been used to analyze spatial accessibility in London, Jeddah and Manhattan for the re-design of the World Trade Centre. Norman Foster re-iterates the added advantage of using the tools noting, “these techniques work from the tough environment of practice. I love the world of analysis, observation, of research, but also of passion, imprecision, the hunch. Space syntax is the testing ground of the interaction of these opposing worlds” (Foster 1997, in Hunter, 2010). The method was used to correlate spatial integration with observed pedestrian movements in Stockholm (Marcus 2010).

Studies employing space syntax methods have also been extensively employed in the field of archaeology. Vila et al. (2003) used the JPG method of analysis to develop a socio-cultural interpretative model of the material culture and infer the socio-cultural set up of an excavated site at the Elvina hillfort, Galicia, Spain. Fisher (2009) developed an integrative method of access analysis that was used to determine where social identities could be displayed and negotiated in a monumental building of the late Bronze Age, c. 1650-1100 BC in Cyprus. Hillier (2007) discussed the probable social factors responsible for the layout of ancient Teotihuacán using integration values of the site while Benech (2007) combined syntactic analysis and geophysical methods to compare two blocks of domestic spaces in Doura-Europos, Ancient Near East. This formed a basis for establishing social and cultural aspects of space use. Funari and Zarankin (2002) employed space syntax methods to discuss the structuring of middle-class households in Buenos Aires since the late 18th Century, demonstrating that morphological and spatial changes in households reflected capitalist and gender control in material artifacts of the houses.

Over the years, space syntax has grown from a method of analysis to a specialty at the University College London and its associated commercial branch, the Space Syntax Laboratory. Its popularity is evident in the establishment of a bi-annual international symposium and the ever-increasing papers published in relation to its cause. Its use, however, offers more objective and robust results when combined with other methods such as observation of space use, interviews and ethnography.

3.7 Combining methods from allied disciplines of the built environment

Several studies have reported combining methods from architectural and non-architectural approaches discussed in the foregoing sections as a way of mitigating some criticisms of qualitative methods being too subjective, not replicable nor generalizable with more objective methods of space syntax analysis. Background information from qualitative techniques such as ethnography and participant observation mitigate the main criticism of space syntax analysis, that of insufficient information based on a 2D representation of a layout. Osman (1994) and Muhammad Oumar (1999) combined the use of ethnographic data and spatial analysis, JPGs and IVs to establish socio-cultural factors, which to a large extent determined house form. Osman's ethnographic study of Sudanese houses for example revealed gender divisions in the conduct of activities and use of space, whereas spatial analyses highlighted the morphological pattern of segregation in Sudanese houses. Importantly, the two methods combined indicate, "the traditional Sudanese house is not only divided into female and male quarters, but also that these quarters are spatially segregated" (Osman 1994:200). Muhammad Oumar's study in Kano, Nigeria employed space syntax methods to unearth some cultural genotypes as well as establish similar findings particularly the segregation of spaces within Hausa compounds³⁶.

Similarly, Dawson examined the case of the Inuit in the Canadian Arctic region being resettled in Euro-Canadian houses. The interdisciplinary methodology employed space syntax analysis to determine the integration values of rooms. Observing the daily activities in a sample of Inuit households followed this. These were then compared with room IVs to determine the degree of fit, which bears a similar underlying logic to Esber's approach discussed in section 3.4. Dawson found that Inuit families use space in ways that do not often match

³⁶ Refer to p. 46

functional categories of Euro-Canadian houses. This is because a “high degree of centrality closeness displayed by Inuit families allows individuals to regularly access information through other family members . . . which is vital for sustaining the social networks of mutual dependencies” (Dawson 2008:124). In turn, these networks facilitate activities such as harvesting, arranging childcare, pooling labour, equipment, sharing and consuming food, unlike found in Euro-Canadian families. This misfit was bound to result in problems and generate a tendency towards returning to former houses and ways of life.

Cil’s study on the transformation pattern of houses in Kula, Turkey explored the morphological and syntactic qualities of the houses, alongside their everyday use in the last quarter of the 20th Century. The objective in comparing the houses was to “present the sociology of the domestic space that does not fit into previously suggested sharp categorizations and sequential/orderly transformations” (Cil 2007:060-02). Historical documents, measured drawings, space syntax analysis and observed use of space within sixty houses were employed to achieve the stated objective. Morphologically, three categories of houses were distinguished-the Ottoman or old house type, the westernized or Rum style houses as well as a hybrid of the Ottoman and Rum style, which emerged as an adaptation of traditional and modern lifestyles and space use in the town. Syntactically, the houses did not suggest a corresponding clear sequence in terms of lifestyle as majority of the houses were found to be of mid-core house types. Previous studies characterized transformation patterns into categories such as introverted or extroverted, innovative or conservative, with deep-core houses associated with an introverted conservative lifestyle while shallow-core houses were linked with an extroverted lifestyle, open to external influences (Cil, 2007). Mid-core houses fall in between these two syntactical categories. Together, mid and shallow-core house types dominated the sample, suggesting external influences on traditional Ottoman houses in the area. This

was confirmed by the continued use of spaces such as the courtyard and the sustained relationships between spatial parts of new configurations, interpreted as the continued deployment of traditional lifestyles over time. Importantly, “the dominance of the transitional and existence of the hybrid types in Kula also suggest that some changes may have been adopted not because of their better comfort levels but because of their immediate/local social significance and meaning” (Cil 2007:12).

In conclusion, this review revealed that employing interdisciplinary approaches to address issues regarding housing and the built environment is advantageous in order to achieve holistic interpretations of results. Importantly, it illustrates that while combining methods from several disciplines can be demanding and sometimes complex, the strengths of one method can help balance the weaknesses observed in another³⁷. Combining ethnography and space use has been illustrated to especially mitigate criticisms of space syntax analyses as the layouts are analysed based on patterns of space use. The next chapter explains how these methods were combined to address the aims of the present study.

Conclusion

This chapter reviewed literature on approaches to the study of vernacular architecture in two main categories from architecture and non-architectural disciplines comprising anthropology, behavioural studies and sociology. Whilst combining techniques from the two categories could often be complex, the strategy offers great benefits for a holistic understanding and interpretation of phenomena to address housing related problems. They have also been shown to balance out the criticisms observed in both qualitative and quantitative approaches. The next chapter discusses how interdisciplinary methodologies are employed in the present study.

³⁷ Table 8.1 presents the strengths, weaknesses, opportunities and threats encountered in the present study.

CHAPTER FOUR

CHAPTER FOUR: **RESEARCH METHODOLOGY**

Summary

This chapter builds upon the conclusion of Chapter Three-that of utilizing interdisciplinary research methods for studies in vernacular architecture. The theoretical framework for the study is based on five interdisciplinary concepts. These are user lifestyle from anthropology, use of space from sociology, spatial configuration, house form/residential structure from architecture and socio-cultural factors, which combines all of the disciplines. These concepts relate to issues raised in the introductory chapter and are explored in two surveys, an ethnographic and measured survey. The chapter concludes with explanations on interpretation of results from the surveys in relation to identified problems in Chapter One.

4.1 Theoretical and conceptual framework

One of the reasons for undertaking a literature review, apart from establishing the gap in knowledge, is to retrieve and assess suitable methodologies relevant to the study at hand. Many of the studies reviewed however lacked clear and distinct theoretical/conceptual frameworks, which would have been useful. This is partly because examples from Nigeria generally had background information on cultures investigated such as history or ethnography. Furthermore, their aims rarely linked changes in lifestyle to problems observed in the built environment, or established socio-cultural influences on built form, unlike the present study. Exceptions to this are works linked to some PhD dissertations³⁸, such as Asquith (2006b) and most of Rapoport's writings³⁹. In line with the purpose of this study, which is to establish the contemporary socio-cultural factors which guide the production and use of domestic space in Tangale land, the study proposes the following as concepts: user lifestyle, use of space, spatial configuration, house form/residential structure and socio-cultural determinants (Maina, 2012a).

³⁸ Other works associated with or are PhD dissertations, which outline research methodologies include Schwerdfeger (1982), Popoola (1984), Mohammad Oumar (1997) and Esber (1987).

³⁹ Rapoport's works (1990, 1998, 2007) for example are liberally accompanied with explanatory and schematic diagrams.

4.1.1 User lifestyle

User lifestyle refers to the outward expression of one's self-concept formed through social actions. "In other words, lifestyles are determined or influenced by such factors as culture, sub-culture (family, social classes etc), values and personality" (Ozaki and Coolen 2004:7). Rapoport asserts that this means "a particular sequence of increasingly specific expressions of culture-worldviews, values, images, lifestyles and activity systems . . . lifestyle is the outcome of choices about how to allocate resources. Together lifestyle and activity systems are extremely useful in analyzing and designing environments" (Rapoport 1990:9-10). For the purpose of this study, lifestyle relates to the various relationships and activities between inhabitants in a household and the larger community/settlement as an expression of a shared worldview. This is invariably influenced by changes in technology, materials, economy, education, decision-making and acculturation.

4.1.2 Use of Space

Use of space relates to the different ways a cultural group assigns function and meaning to spaces. This directly impinges on activities and settings. "Activities, what we do and where, not only affects room function, but also spatial and social relations within the home" (Asquith 2006b:4). Plimpton and Hassan (1987:449) posit, "the type and combination of house components reflect a distinct modular patterning of space use". Closely related to this is the issue of boundaries, which lead to spatial configurations. "The basic boundaries in a house are therefore expressions of culturally recognized norms which regulate human behaviour" (Ozaki and Lewis 2006:91).

4.1.3 Spatial Configuration

Spatial configuration evolves from the way space is organized by its use in a culture and the relationships between spaces. Hillier (2007:190) notes, "in many parts of the world there is an obvious relationship between the social structure and spatial structure of settlements, villages and camps . . . spatial configuration seems to be almost a projective representation of social structure". Hillier also asserts, "the investment societies make in space varies along three fundamental dimensions: the degree to which space is structured at all, the degree to which space is assigned specific social meanings and the type of configuration used" (Hillier 2007: 191-192). This is perhaps most evident in house form.

4.1.4 House form and residential structure

House form refers to the plan and shape of spaces in the house distinct from its style or elevation (Ozaki and Lewis 2006). This distinction is necessary as the plan is what architects traditionally use to organize and graphically represent space and its use for specific functions. Consequently, "house form is not simply the result of physical forces or any single causal factor but the consequence of a whole range of socio-cultural factors seen in their broadest terms" (Rapoport 1969:47). Residential structure encompasses the organization, style and appearance of the house. It is what appeals visually in elevation.

4.1.5 Socio-cultural factors

Socio-cultural factors to a considerable degree influence the planning, organization and use of domestic spaces. They include basic needs, gender roles, occupation, privacy, social network, kinship status, security, institutions etc (Rapoport 1969, 1998). They organize the way of life, shared beliefs and values of a community, distinguishing them from others even within the same geographical location.

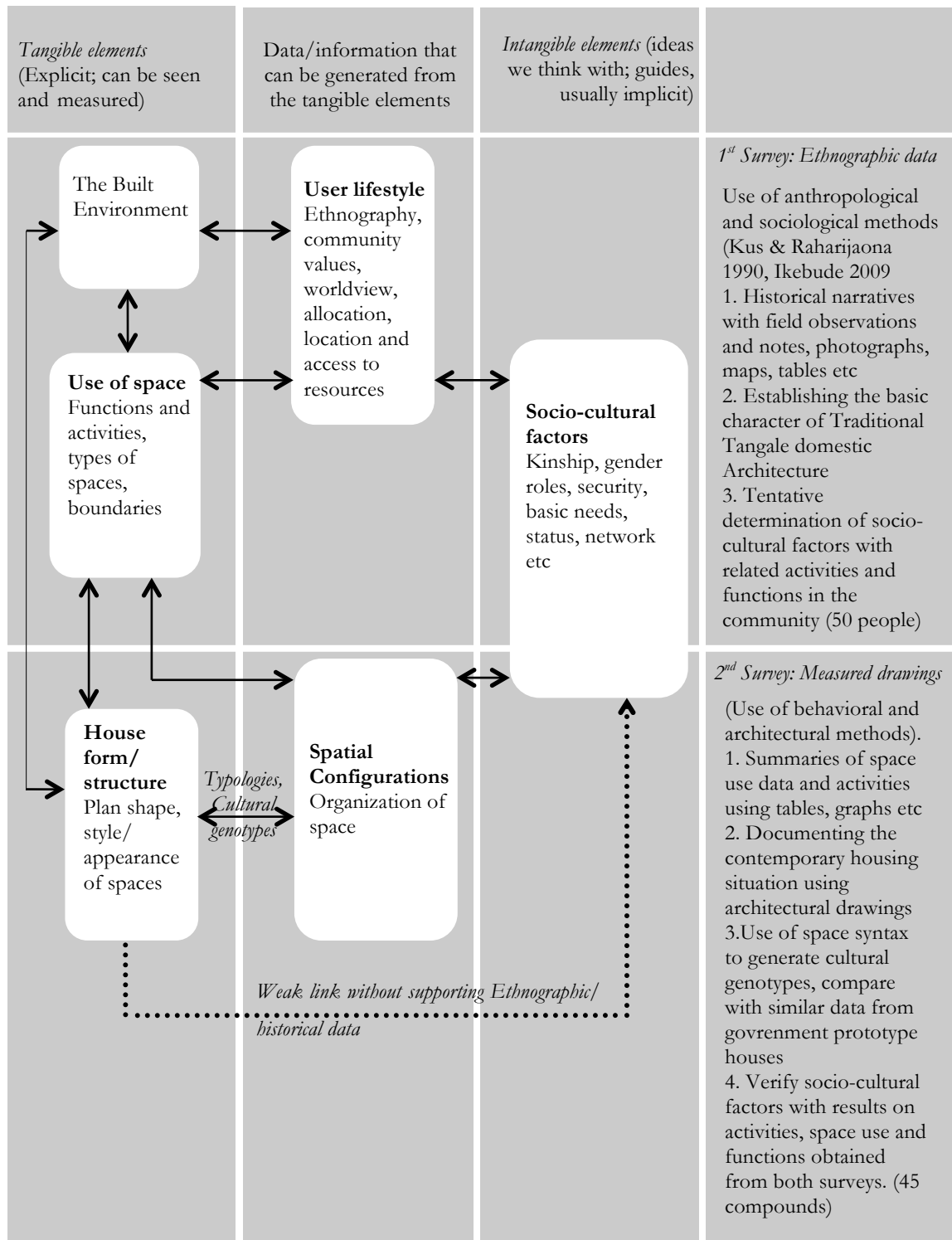


Figure 4.1: Theoretical and conceptual framework (Maina, 2012a)

4.2 Methodology and approach

The Literature Review at the end of Chapter Three re-iterated the need for an interdisciplinary approach to vernacular studies. This was adopted for the present study. Unlike the vast majority of research carried out in Nigeria on traditional and vernacular architecture, the history/ethnography of the cultures studied were usually given⁴⁰. This is not the case with Tangale land⁴¹. Consequently, two surveys were undertaken as presented in *Figure 4.1*.

Conducted between December 2010 and February 2011, the first survey was employed to unearth ethno-historical precepts of Tangale land. This provided background data for establishing the character of traditional Tangale architecture. Ethnography was chosen because it offers a wide range of possible techniques to address the dearth of data regarding culture, housing and the built environment in the study area. Specifically, unstructured interviews, participant observation, photographs, drawings and sketches were chosen as techniques to achieve this objective. Unstructured interviews presented the opportunity of eliciting first hand informant accounts of the culture, the everyday life and daily routine of community residents prior to colonial rule or any external influence. Participant observation was employed to document communal activities occurring in their natural settings within the contemporary built environment. Photographs, drawings and sketches added depth to the cultural narrative. The alternative to employing this approach was to review available literature in the form of a few unpublished theses largely relating to historical and political issues of the community, official gazettes/bulletins and survey maps that were not always comprehensive or detailed. These were insufficient to adequately present a true account of the culture and lifestyle of the community especially regarding issues

⁴⁰ Saad (1981, 1991), Schwertfeger (1982), Popoola (1984), Moughtin (1985), Mohammad Oumar (1997), Mbina (1999), Osasona (2007), Mai and Shamsudeen (2007, 2008) and Oyedale et al. (2010) all relied on already documented ethno-historical data of various cultures investigated.

⁴¹ See p. 13 on justification for the study.

of housing and domestic architecture. Consequently, the ethnographic survey proffered possible relationships between changes in user lifestyle and the observed social problems enumerated in Chapter One. It also formed the basis for the suggestion of socio-cultural factors likely to determine house form and residential structure in the study area. Kus and Raharijaona (1990) employed a similar approach in studying the Betsileo culture in Madagascar. This was “a first attempt to understand information from a brief ethnographic inquiry undertaken during a season of archaeological fieldwork” (Kus and Raharijaona 1990:21). The authors then established a cultural worldview and logic entrenched in the socio-cultural factors of gender, seniority and rituals surrounding life and death. These were unerringly reflected in the house form of the Betsileo people. Ikebude (2009) employed a similar strategy to demonstrate how architecture reflected the worldview of the Igbo society in South Eastern Nigeria⁴². Further details of the procedure are discussed in Chapter Five, Tangale Ethnography. Importantly, this survey was instrumental in establishing space use patterns in the community for further analysis using space syntax methods in the second survey.

The second survey, conducted between September 2011 and January 2012 involved administering questionnaires on the physical production of buildings, relationship to neighbours, location of compounds, documentation of housing typologies, production, materials, building resources and services. These are combined with observation of space use and physical measurements of the compounds for space syntax analysis. This approach, consisting of physical measurements of compounds, structured interviews and space syntax analysis was chosen for the present study primarily due to three reasons. First, scaled drawings of a sample of compounds from the community were necessary to document and provide objective evidence to changing typologies in the community. An alternative to this technique would entail the use of photographs,

⁴² Refer to pp. 41-42

sketches and detailed descriptions of each compound. However, plans, sections and elevations are the traditionally accepted ways of representing architectural data and presents different layers and types of information including sizes of spaces, materiality, furniture arrangement, access, form, spatial arrangement etc. These were then supplemented with photographs, sketches and descriptions from interview responses for additional depth. Secondly, interview responses provided data documenting demographics, space use, preferences and infrastructure that was useful in quantifying and analysing variables relating to housing and the built environment. Thirdly, space syntax analyses provided an objective technique of testing the second hypothesis, other observations made during the ethnographic study and floor plans of prototype units. Owing to the limited amount of time for the study, only convex analyses of the floor plans were carried out. Together, these quantitative techniques were conducted to test and verify ideas accruing from the first survey. Additionally, the techniques ensured better objectivity, replicability, generalization and transparency of overall results from the study.

I collected additional data on space use by observing activities within compounds on the first visit prior to securing permission for physical measurements⁴³. This approach was adopted because residents were noted to carry on their normal activities when they were not conscious of being observed. This natural rhythm was lost the moment they were approached for an interview. They unconsciously became formal, often abruptly ceasing the very activity under observation such as sending the children away, changing the location for the interview or going in to dress appropriately. The observed activities were then verified with the respective compound heads (CHs) and their spouses during the interviews and physical measurements of compounds.

A pilot study of Compounds 1-5 was undertaken to ensure the questionnaire elicited the required data for the second survey. Thereafter, the

⁴³ These were later combined with IVs to proffer possible reasons for the abandonment and modification of prototype housing units in the study area. The procedure is discussed in more detail in Chapter Seven.

remaining compounds were surveyed. The main problem encountered was in filling out forms according to scheduled times by compound heads, their spouses and children in a form of brief time diary for a typical weekday and a weekend. This was the original proposed approach. However, due to poor exposure to filling out survey forms in the community and the limited time needed for data collection, this was not practically possible. Instead, basic data on domestic routine in *Appendix 4* was collected from members of households during the survey. The implication of this action is discussed further on pp. 265-266 and in Chapter Eight.

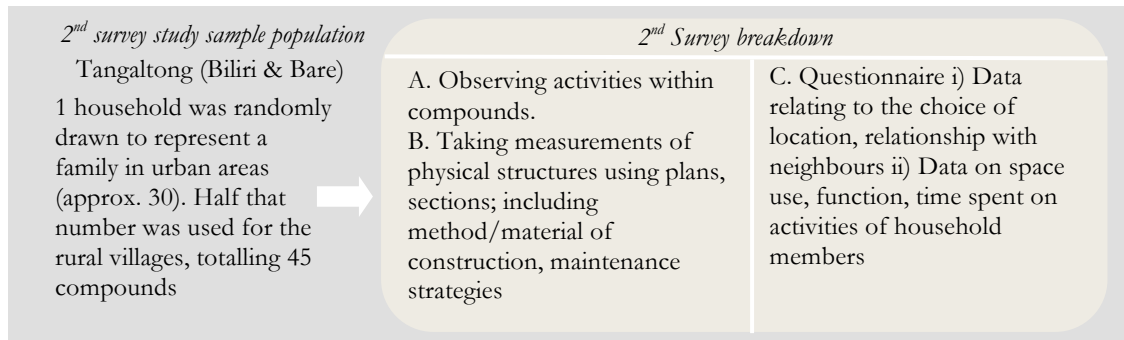


Figure 4.2: 2nd survey sample size selection process.

4.3 Criteria for choosing the sample population

Criteria for selection needed to be established for the sample population prior to both surveys. In most research reviewed, categories available within the communities under investigation were employed. Asquith, in a study of domestic space use, employed housing typologies in the United Kingdom (Asquith, 2006b). Muhammad Oumar (1997), Popoola (1984) and Schwertfeger (1982) all employed wards of walled Hausa cities in Nigeria while Osman and Suliman (2005) utilized types of neighbourhoods in Omdurman, Sudan. The latter “offered a variety of housing experiences ranging from housing designed and built by professionals to those solely created by their owners” (Osman and Suliman 2005:2). In Tangale land, clans offer the best organizing structure (Maina 2009, Maina 2012a, Gwani 1999, Kure 1987). Tangaltong clan was employed as the

sample population for both surveys because Tangale land is organized in patrilineal families descended from seven clans, the first being Tangaltong. Its families were among the earliest to settle on the Tangale hills (Maina 2009, Gwani 1999). The ruling house of the community also belongs to this clan. Furthermore, it is the only clan divided into two sub-clans, *Biliri* and *Bare*. This makes it more complex in social organization in comparison to other clans with the highest number of 29 families (Kure 1987, Mela 2004). Each clan in Tangale land occupies an urban town, apart from its surrounding village settlements. Consequently, Tangaltong is spread across three towns, namely Billiri, Bare and Komta. Importantly, Billiri serves as the administrative headquarters of Billiri LGA (Maina 2009, Maina 2012b). It presents current trends in housing as a result of the impact of globalization and urbanization. As such, it is the most ideal population to address the aims of this study.

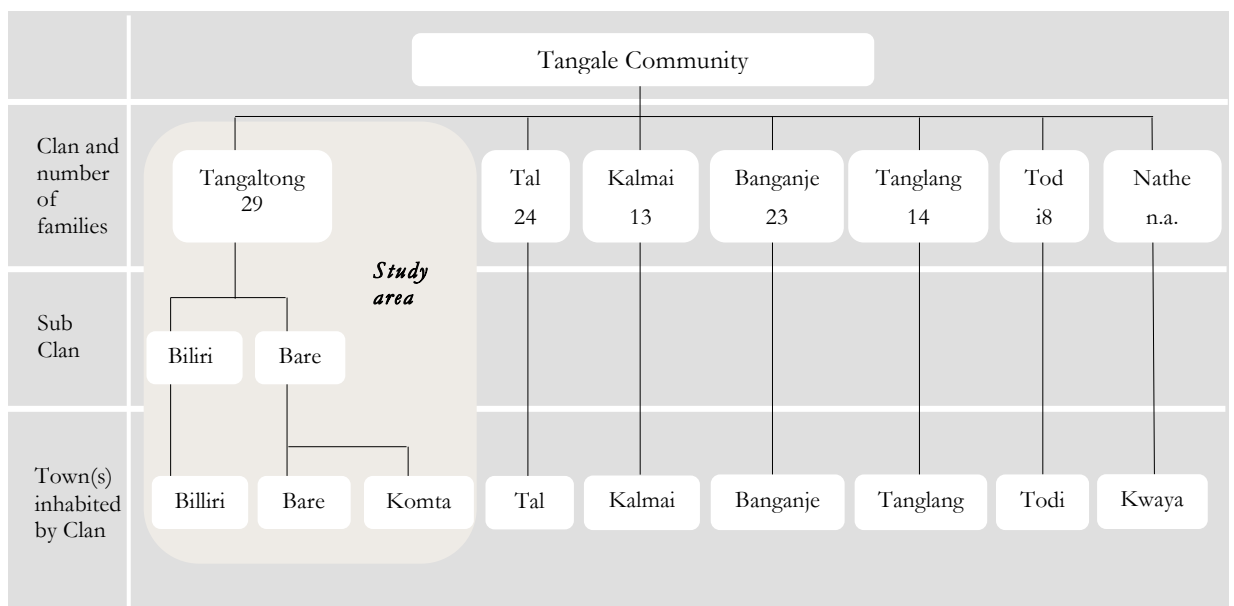


Figure 4.3: *Tangale community set up*. Adapted from Maina (2009), Mela (2004), Gwani (1999) and Kure (1987)



Plate 4.1: **Position of Tangale towns.** Note the density of housing in the area indicated by the selected clan, Tangaltong in relation to the other towns. Source: Google Earth image, July 2012



Plate 4.2: **Closer view of Biliri, Bare and Komta where the sample population resides.** Source: Google Earth image, July 2012

4.4 Interpretation of results

Three issues were raised in Chapter One. These include dearth of architectural information in the study area, increase in socially related problems such as insecurity, crime, slums and the abandonment of public prototype housing units. These require specific forms of data as illustrated in *Figure 4.4*.

A narrative from the ethnographic survey was used to address the issue of changing lifestyles and associated social problems whilst exploring socio-cultural factors predominant in the community. This provided a background history of the community and information on their worldview. This was instrumental in explaining changes in lifestyle expressed in the built environment.

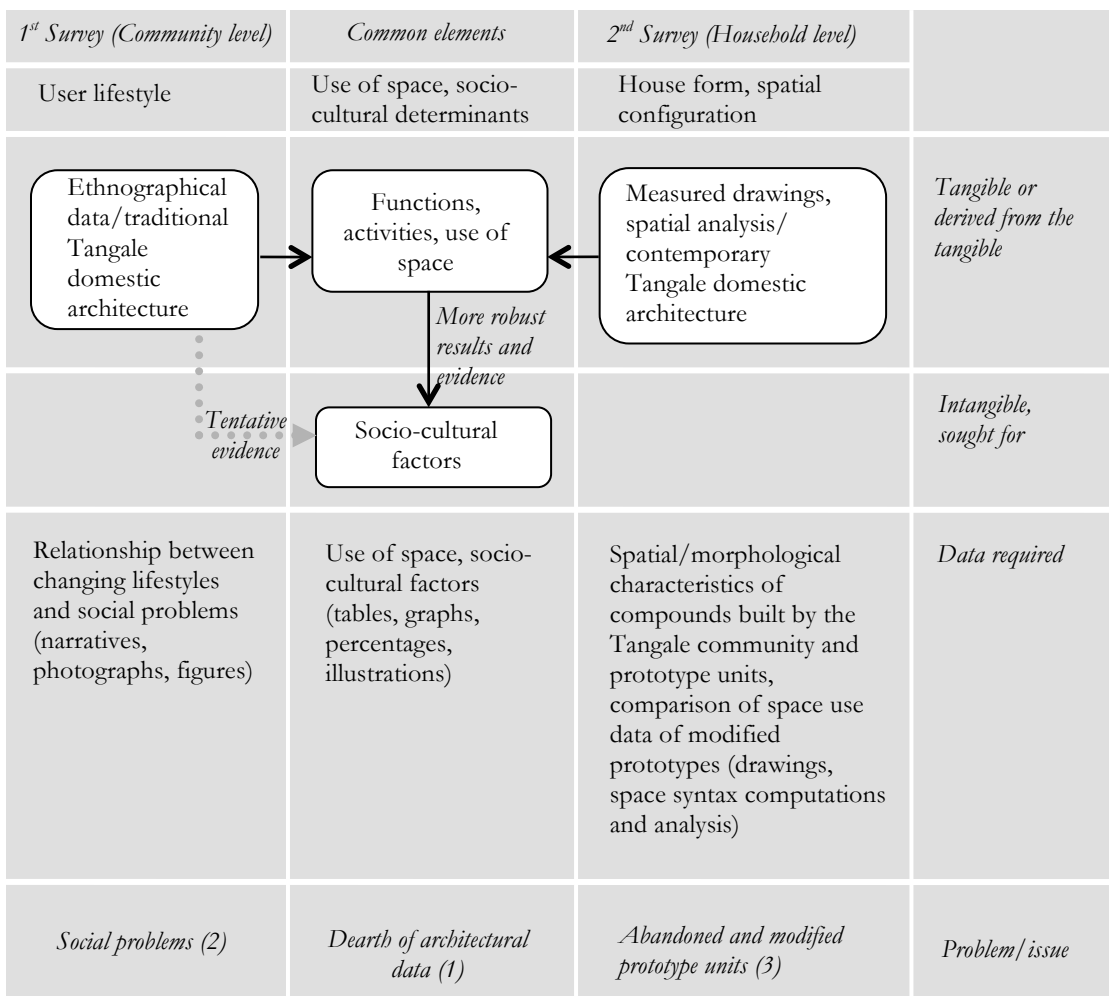


Figure 4.4: Relationship between surveys and interpretation of results.

The second survey was instrumental in eliciting two types of data. These are a numerical evidence of socio-cultural factors through activities and interview responses and documentation of the existing housing situation from randomly selected compounds via measured drawings. The latter were employed to establish housing typologies and integration values for spaces within compounds. These address the first issue, eliciting architectural data in the study area. They also address the first and second hypotheses, that architecture reflects changes within the culture as well as acting as a mechanism of cultural resistance as expressed in domestic structures of the community.

In relation to abandoned and modified prototype units in Billiri, two types of comparisons were made. The first involved a comparison of integration values as well as spatial and morphological data between compounds from the community sample and prototype units. The second compares patterns of space use obtained from the prototype units to those from the community sample. Combined, the results from both sets of comparisons were influential in establishing some differences, which suggest possible reasons for the abandonment and modification of the prototype units in Billiri.

The results from both the ethnographic and measured surveys are presented in the subsequent Section, Part Two, Research Findings.

Conclusion

This chapter outlined the theoretical and conceptual framework adopted for the present study based on approaches from anthropology, sociology, behavioural studies and architecture in order to adequately address the research questions and hypotheses set out in Chapter One. The concepts which include user lifestyle, use of space, spatial configuration, house form/residential structure and socio-cultural factors were organized and explored in an ethnographic and measured survey largely due to a lack of ethno-historical and architectural data in the study area. Findings from the surveys are presented in Chapters Five, Six and Seven.

PART TWO: RESEARCH FINDINGS

1. *Four major events in the history of Tangale people profoundly influenced lifestyle, political administration, house form and residential structure in the community (Maina, 2012b). These were the migration from Yemen to the Tangale hills in the 14th Century, the advent of British colonials, Hausa tradesmen and Christian missionaries at the turn of the 20th Century, relocation to the surrounding lower plains in 1948 and the Introduction of Independence/Federalism from 1960 to date (Chapter 5).*
2. *Four housing typologies exist in the study area (Maina, 2012b). These range from mud huts with conical roofs, a combination of mud huts and rectilinear rooms, the latter sometimes constructed in concrete, rectilinear rooms completely constructed in concrete blocks clad with zinc and the latest style of free standing concrete bungalows roofed with zinc or aluminium (Chapter 6).*
3. *Spatially, the courtyard is the most integrated space for 80% of measured compounds (Maina 2012c, 2013a, Chapter 6).*
4. *Deviations from this pattern, where the most integrated spaces are sitting rooms, dining rooms, corridors or kitchens are generally obtained in compounds inhabited by nuclear families frequently within freestanding bungalows. This correlates with the early stages of compound formation as revealed by the JPGs and survey questionnaires of respondents (Chapter 6).*
5. *Kinship, security, basic needs, gender roles and social status constitute socio-cultural factors influencing house form and residential structure across the sample (Chapter 6).*
6. *The cultural themes of kinship, security and basic needs were not adequately reflected in the location and design of the prototype units built in Billiri. This finding suggests possible reasons for their abandonment and modification (Maina 2012c, 2013a, Chapter 7).*

CHAPTER FIVE: **TANGALE ETHNOGRAPHY****Summary**

This chapter presents findings from the first survey and narrates changes in lifestyle of the community largely due to external influences. The narration is organized in four sections corresponding to the main historical events in the community's history especially from the early part of the 20th Century to date. These include migration from Yemen, the advent of British colonials, Islamic tradesmen and Christian missionaries, relocation from the Tangale hills to the surrounding plains and independence /Nigerian federalism to present day. The reaction of the Tangale community to changes in traditional settlement patterns, lifestyle, political and administrative structure provides an insight into possible reasons for the emergence of observed socially related ills described in Chapter One.

5.1 The case of architectural ethnography in Tangale land, an introduction

"Do the Tangale people possess an architecture?" This was the common question informants asked after I had explained my purpose for undertaking ethnography in the study area, which was to gather information about Tangale architecture and culture in the community to enable me address in part, the dearth of architectural research in the community. For an architect, this response was disconcerting. The first of such encounters made me rethink many assumptions, what ethnographers call naïve realism or the tendency to believe that "all people define the real world of objects, events and living creatures in pretty much the same way" (Spradley 1979:4). The said encounter took place on a dusty footpath, common linkages to compounds in Billiri⁴⁴. I was on my way to secure permission to interview an elderly woman in Awai, one of the wards in Tangaltong clan areas when I met another potential respondent. After exchanging customary greetings, I asked if he could grant me an interview. "On what?" he asked. I explained my mission and his incredulous response was "Tangale architecture? I don't think that exists. We do have a culture, but not architecture". "What of these houses and compounds I see around us?" I asked,

⁴⁴ See Appendix 17

gesturing around me. We stood at the intersection of two footpaths which were mostly lined with walls above which could be seen houses or huts roofed with corrugated iron sheets or thatch⁴⁵. As an architect, I was mentally categorizing the array of typologies and postulating possible influences on domestic building types. "Oh, these are *mana* and not the architecture you think" he replied. I barely managed to restrain myself from explaining that I wasn't referring to towering skyscrapers, glass and concrete jungles as many informants assumed but the structures community residents designed and built to accommodate their daily routines, lifestyles and families. After obtaining similar responses several times, I soon realized my respondents had their own set of presumptions and my focus needed to primarily change from architecture to culture and lifestyle, from being an interviewer of respondents to a student learning from informants, from an architectural researcher to an anthropologist, sociologist and observer of behaviour. This was an exercise I was ill prepared for in all my formal years of training as an architect. Even though I had attended some preparatory graduate courses on ethnography prior to embarking on the fieldwork, the finer points of conducting such a study was learnt hands on, in the field.

Consequently, the structured interviews I had envisioned took on an informal nature with potential interviewees becoming informants talking about their lives and families. These often extended into multiple sessions occasionally involving focused group discussions. Many informants also took me to visit their aged parents, uncles and aunts who had experienced traditional life on the hills. I was thus able to ask questions about the details of traditional Tangale life, what I observed in the compounds and community such as food preparation, names of specific spaces or tools as well as the reason certain activities took place where they did and the meanings attached to them. To achieve the objectives of this initial survey, a comprehensive list developed in the *Encyclopaedia of Vernacular*

⁴⁵ Tangale traditional architecture largely consists of domestic structures. See pp. 169-178

Architecture was adapted for the purpose of this study. Data for ethnography was sourced from two broad categories. The first, relating to environmental factors such as climate, location and site, settlement type, territory and historical background were sourced from government documents, publications, gazettes, reports, books, survey maps and a hand written personal account by Alhaji Bello Awuni, the late *Walin Tangale*. This document I translated into English from the original Hausa language it was written in⁴⁶. The second section of the interview questionnaire⁴⁷ relates to intangible socio-cultural facets of the culture. These I employed in semi-structured interviews with 50 informants in the community who would have experienced the traditional form of Tangale life as adults or children on the hills⁴⁸. Information from this section often appear as quotes with disguised names to preserve informant confidentiality. Factors discussed include domestic routine, economy, family type and cycle, food preparation, gender roles, kinship and residence, language, meanings especially as reflected in activities and settings, play, politics and political organization. Others include religion and beliefs, rites and ceremonies, social structure and spatial organization, symbolism, traditions, transmission of skills, values and norms, effect of westernization and cultural interaction.

Two factors proved advantageous for this study. I was female and understood the languages spoken in the community, which are Tangale and Hausa. Being female was non-threatening in an area where insecurity is an issue. This is also the case with other parts of North East Nigeria. Tangale culture, as common with many African societies, views women as being weaker than men

⁴⁶ It is referred in the narrative as Wali (2011). Wali was the popular name the late Alhaji Awuni was popularly known as in Tangale.

⁴⁷ Appendix 3

⁴⁸ I had earlier documented that traditional form of life culminated in the resettlement of the Tangale community in 1948 from the hills to the location they now inhabit (Maina, 2009). No one lives on the Tangale hills anymore. For a grounded ethnography, those aged 50 years and above would have at least experienced that lifestyle or heard detailed accounts from parents and family. Few hill residents were alive as at the time I conducted this initial survey. For example, two elderly respondents had passed away when I returned for the second measured survey in 2011. Those alive contend with one form of impairment or the other such as deafness or blindness due to age.

and thus unlikely to pose any security threat within compounds. Being fluent in the Tangale language broke down initial inhibitions as well as reduced the time spent in communication. Although a native of the community, I was raised in several urban towns of Northern Nigeria by parents who were civil servants working for the government. My grandmother who lived with us throughout my childhood could only communicate effectively in Tangale. This meant my siblings and I learnt the language in order to relate well with her. As such, communicating with the elderly, who formed the vast majority of informants in the first survey, became much easier. After interacting with the first twenty or so informants, certain events became frequent references during the course of discussions. These include migration from Yemen and settlement of the community on the Tangale hills, advent of colonials, traders and missionaries, relocation of the community to the lower surrounding plains and Nigeria gaining independence. Consequently, these four events formed the main themes of the ethnographic narrative (See Figure 5.1).

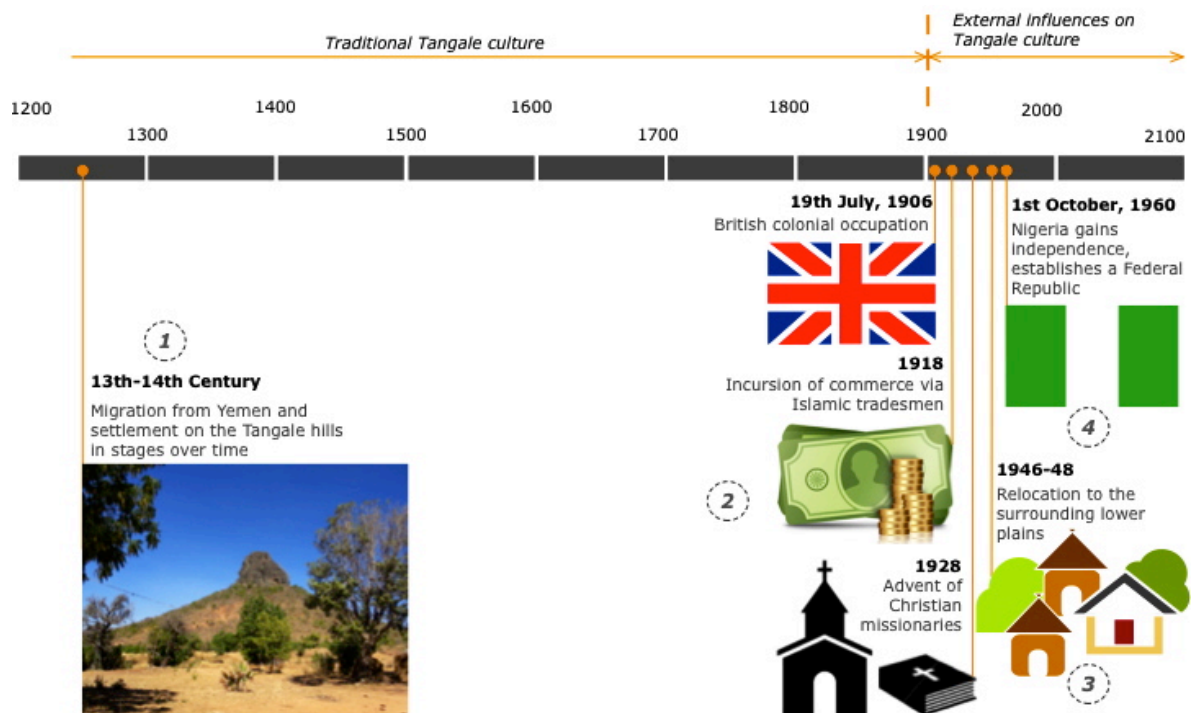


Figure 5.1: Timeline illustrating four main events in the history of the Tangale community.

Section 5.2 on the migration from Yemen to the Tangale hills provides a description of the basic facets of Tangale traditional culture and settlement based on kinship and social network, security, farming as an occupation, gender roles and basic needs. These were unerringly reflected in the spatial layout and residential structure of traditional Tangale domestic compounds. Sections 5.3-6 describe changes to the culture via advent of external influences of colonialists, Islamic traders and Christian missionaries as well as the community's reaction to these influences. These findings were instrumental in addressing the first, second and fourth research questions posed in Chapter One relating to the basic lifestyle, changes over time and the relationship between these changes and observed social ills in the community. The chapter concludes with a reflection on the role of the architect as an ethnographer in light of earlier assumptions made about the study of architecture and culture.

5.2 Migration from Yemen to the Tangale hills (13th -14th Century)

The name Tangale was derived from a combination of two words, *Tangal* and *le*. *Tangal* is believed to be the name of the first chief of *Biliri* and second ruler of the kingdom. *Le* is a customary greeting in the Tangale language literally meaning hello. "Tangal + le were eventually combined to form what is known as Tangale today" (Maina 2009:73). Interestingly, Tangale oral legends have consistently traced the community's roots to Yemen, which is south of the Saudi Arabian Peninsula. Another version has it that from the original Arabian lands which the Tangale came from, there existed a tribe known as the *Taghlib*, where it is also suspected that after centuries of travel and oral transfer, the name metamorphosed into what is referred to as Tangale today. This collaborates with the history of the Taghlib tribe as one of four Arabian tribes formed after the demise of Prince al-Harith, the ruler of the Kindah race, which split the tribe into four-Asad, Taghlib, Qays and Kinanah. "The tribes feuded constantly and after

about the middle of the 6th Century, the Kindah princes were forced by local tribesmen to withdraw once more to Southern Arabia" (Taghlib, 2011). This explains why the Tangale people claim to be from Yemen, which is South of the Saudi Arabian Peninsula (See *Figures 5.2-3*).

History has it the Tangale people moved out this geographical location due to a catastrophe. It is believed around that period, the dam supplying water to the southern region of Saudi Arabia collapsed and overflowed, submerging the land around it. The dam was known as *Saddu-Marib*. Stewart (1978:74) asserts there were "reports of the collapse of a dam in Yemen in the peninsula's south west corner, the reason of its collapse being a debate among historical scholars". The commonly ascribed reason was exceptional rainfall or an earthquake. Some sources⁴⁹ however suggest that the walls of the dam, built in many stages over time, simply gave way⁵⁰. This civilization is widely believed to be the ancient Sabea Empire with links to the Queen of Sheba. The survivors were therefore compelled to leave the region, among them the Tangale. This large multitude, made up of many tribes was believed to have crossed the Red Sea into East Africa⁵¹. Travelling southwards, they settled in a place called San, around Ngazargamu (Gwani, 1999). At that time, Ngazargamu was the capital of ancient Borno empire located about 30 km east of Geidam in present day Yobe State of Nigeria. This account largely explains why the Tangale people share commonalities in language and culture with other tribes in Borno and many surrounding states of North East Nigeria (Kure, 1987).

⁴⁹ See Chanson, H. (2004). Also Marib Dam (2011); Lendering, J. (2011)

⁵⁰ This explanation is ascribed to the book written by Alh. Abubakar El-Napaty, titled "*Asubabin Musulunci*" by Wali p 8.

⁵¹ This also explains why the Tangale people share a lot in common with other tribes in Borno State, one of which is that their rulers are known as *Mai*.

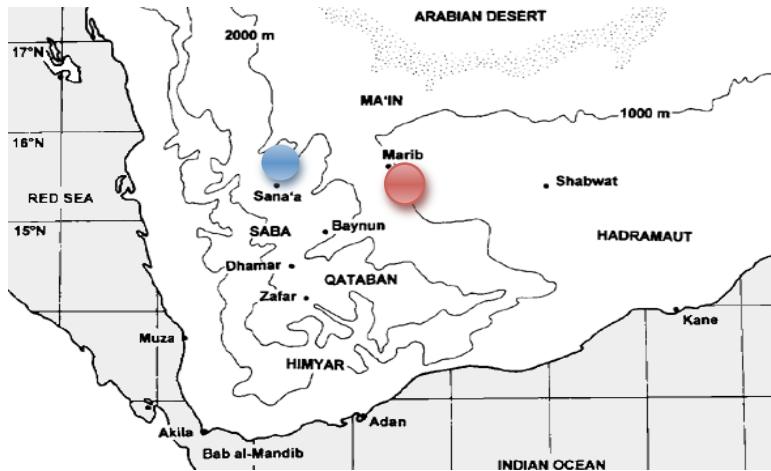


Figure 5.2: Location of Marib and the region of Sabea civilization in relation to the present day Yemeni capital, Sana'a. Source: The Banyun mapping report (1998).

The stay around Ngazargamu was believed to be have been long, likened to permanent residency until a series of inter tribal wars threatened the security of the populace. This initiated another move to Kufto, near Bajoga in present day Nafada LGA of Gombe State. Wali (2011) narrates that during the reign of *Sarki Dauda*, ruler of Ngazargamu, there was an outbreak of lawlessness ascribed to the presence of a group of peoples collectively known as *Bulala*, *Fitri* and *Madamo*. They were said to have terrorized the tribes and no one dared rise against them. This situation continued until the reign of *Sarki Idrissa* who was determined to put a stop to the incessant menace. He organized a revolt and prevailed over them. However, many tribes had left Ngazargamu for Kufto, among them the Tangale. At Kufto, the tribes, which include the Tera, Bolewa, Waja, Kare Kare, Longuda, Dadiya, Pero and Shomgom were believed to have parted ways, each tribe led by a leader (Attah 2004, Kure 1987). In the case of Tangale, this leader was known as *Goddi*. Interestingly, this name collaborates with a popular Tangale saying, *Tangle goddi* or *Tangle la koddi*. Mallam⁵² Dauda, one of my informants noted, "this phrase is still used to describe behavior only a typical or authentic Tangale person will display". The Tangale people then moved southwards before eventually settling on the Tangale hills (Figure 5.3).

⁵² Mallam is the Hausa equivalent of teacher in English. The female variant is Malama. In this and many other communities in northern Nigeria, the name has come to be associated with a respectable or mature man.



Figure 5.3: *Reconstructed map of West Africa and the Middle East showing the stages of relocation of the Tangale people* (1) Marib, Yemen (2) Ngazargamu, East of Geidam in Yobe State (3) Kufto, near Bajoga in Nafada LGA of Gombe State (4) Tangale hills, Billiri LGA, Gombe State.

5.2.1 History and settlement of each clan

The Tangale people did not settle all at once after leaving Kufto on the hills. As frequently found with oral traditions, sources are divided over the exact sequence of arrival of two families, *Nathe* and *Kwawuli*. Gwani (1999) opines the family of *Kwawuli* was the first to settle in the area. Wali (2011:10) however narrates “the people arrived the location of the first settlements clan by clan, with *Nathe* arriving first”. They were believed to have settled in an area towards the northeast on the Tangale hills. Next came *Kwawuli*, who settled towards the northeast of the hills. *Bekeri* and *Long*, who settled in towards the south and northeast respectively, followed them. The family of *Miyem-ma-mai* then settled in an area towards the East known as *kwi-kungu*. *Miyem-ma-mai* in Tangale means people of the ruler or king while *kwi-kungu* means the head of *kungu* or hump. Since this was near the area inhabited by the *Bekeri* family, the two were bound to meet although both were ignorant of their respective proximity owing to thick vegetation on the hills. One day, “a man from *Miyem-ma-mai* noticed smoke nearby and in tracing its origin, he was able to locate a man from *Bekeri* who incidentally was clearing his farm in

readiness for the planting season” (Wali 2011:10-11). After exchanging pleasantries, the former inquired how long the people from *Bekeri* had been in the area. The man honestly related when he settled in the area. The man from *Miyem-ma-mai* was believed to have convinced his kinsman from *Bekeri* that his family had been there before them. He also added that his was the ruling family. The man from *Bekeri* accepted all these claims at face value. In this manner, the family of *Miyem-ma-mai* were said to have gained ground as the main authorities of the land. In similar fashion did the people from *Miyem-ma-mai* convince the *Kwawuli* family and even the people of *Nathe*, original settlers of the hills. They however faced a problem with the *Long* family. Their representative agreed that the family of *Miyem-ma-mai* was the undisputed ruler of the land but not their claims over the hills because they knew when the people of *Miyem-ma-mai* arrived and settled around *kwi-kungu*. The representative of the ruling house did not consent to this argument. Instead, he suggested a spear-throwing contest at the hill. The spear of whomever between them adhered to the rock will hold claim to the area. This idea seemed good. The man from *Miyem-ma-mai* however proved cunning. He searched for and found a cleft where water flowing from the hill’s summit had created a split within the rock. He put a large amount of honey into this crack, safely hidden from view. When the contest began, the man from *Long* started first, throwing his spear toward the rock, which naturally fell away. This happened three times. After the third failed attempt, avid spectators decided it was the turn of the man representing the ruling family. He was more confident knowing the adequate preparations he had made. To the immense surprise of the crowd, his spear adhered to the rock when he aimed at the spot he had prepared. This made the people stand in awe of

the man from *Miyem-ma-mai* but unfortunately created more problems with the family of *Long*.

Following this incidence, there arose the issue of who owned a particular brook known as *latede*. In Tangale, this means small river or brook. Due to its proximity to the area occupied by the ruling family, people from *Miyem-ma-mai* claimed it. But the people of *Long*, being their neighbors also claimed ownership of the brook. Ways to amicably resolve the impasse proved futile until the representative from *Long* proposed another contest. This time whomever *latede* answered when called upon would be the one the brook was loyal to. This would be a visible claim to ownership. In this instance, the man from *Long* was more cunning. He stationed his fellow kindred in a crevice within *latede*, instructing him to hearken carefully to his voice before answering. When the appointed time for the contest arrived, the man representing the ruling house was asked to start. Although he called out three times, there was no response. When the time came for the man from *Long*, he called out with a loud voice, and sure enough, his kindred answered back even more loudly. Thus the matter was settled-*latede* belonged to *Long*.

Wali (2011) notes that in this way people from *Miyem-ma-mai* assumed leadership even though families from *Nathe* were the first to settle on the hills. Unfortunately, no records were found to the effect that a *Nathe* man ever ruled Tangale land. They were however held with high esteem within the community. This was evident in the use of two valued commodities-farmland and locally made beer, also known as *men*. Oral tradition has it if a *Nathe* man started cultivating your farm, there was nothing you could do to him until the day he decides to leave. Only then could you return to it. So it was with hunting. A man from *Nathe* could hunt anywhere within the territories of other clans and no one dared challenge

his authority. Similarly, when people had drunk beer during an occasion and had dispersed, as soon as a *Nathe* man showed up, it was the responsibility of the head of the household to find ways of serving him beer. Tangale people had a strong belief that to withhold anything from a *Nathe* man incurred curses, bad luck and misfortune.

The first settlement to be built on the Tangale hills was Tangaltong, after *Nathe* had been established. This is why the Tangale use the adage *Tangaltong kwi Tangle*, meaning Tangaltong the head of Tangale to describe a leadership role. Tangaltong consists of two sub-clans or sections, namely Kanthali-Pandi and Bare. Families under Kanthali-Pandi were Biliri, Kanthali, Begle, Labwini, Kanthilang, Keleng, Dongol, Lapandi, Kalkulum-Rah and Yangye (Wali, 2011). The second section, collectively known as Bare consists of Barem-Tai, Kalpelle, Tongli, Da'anta, Lakomta, Kalguru, Long, Womi, Hankali, Kolkwali, Kalkullum and Komta. Each section was called *pi-kwagam*, which literally means behind or protected by a shield. The shield refers to the authority belonging to the sub-clan. Many informants described this as form of settlement as *di kwi pandi*, living on the hills. An elderly man explained,

"Tangale settlements and compounds, mana were organized strictly according to families and clans based on a strong patrilineal kinship relationship, di molle. Everyone looked after the best interest of his neighbours, who were typically kinsmen either uncles, brothers or cousins".

This worldview is expressed in the Tangale proverb, "when one is in difficulty, he can only rely on his relations". A sibling is likened to hair in the nose, *wok la wisin*, which cannot be removed without pain; it is not easy to disown one's brother.

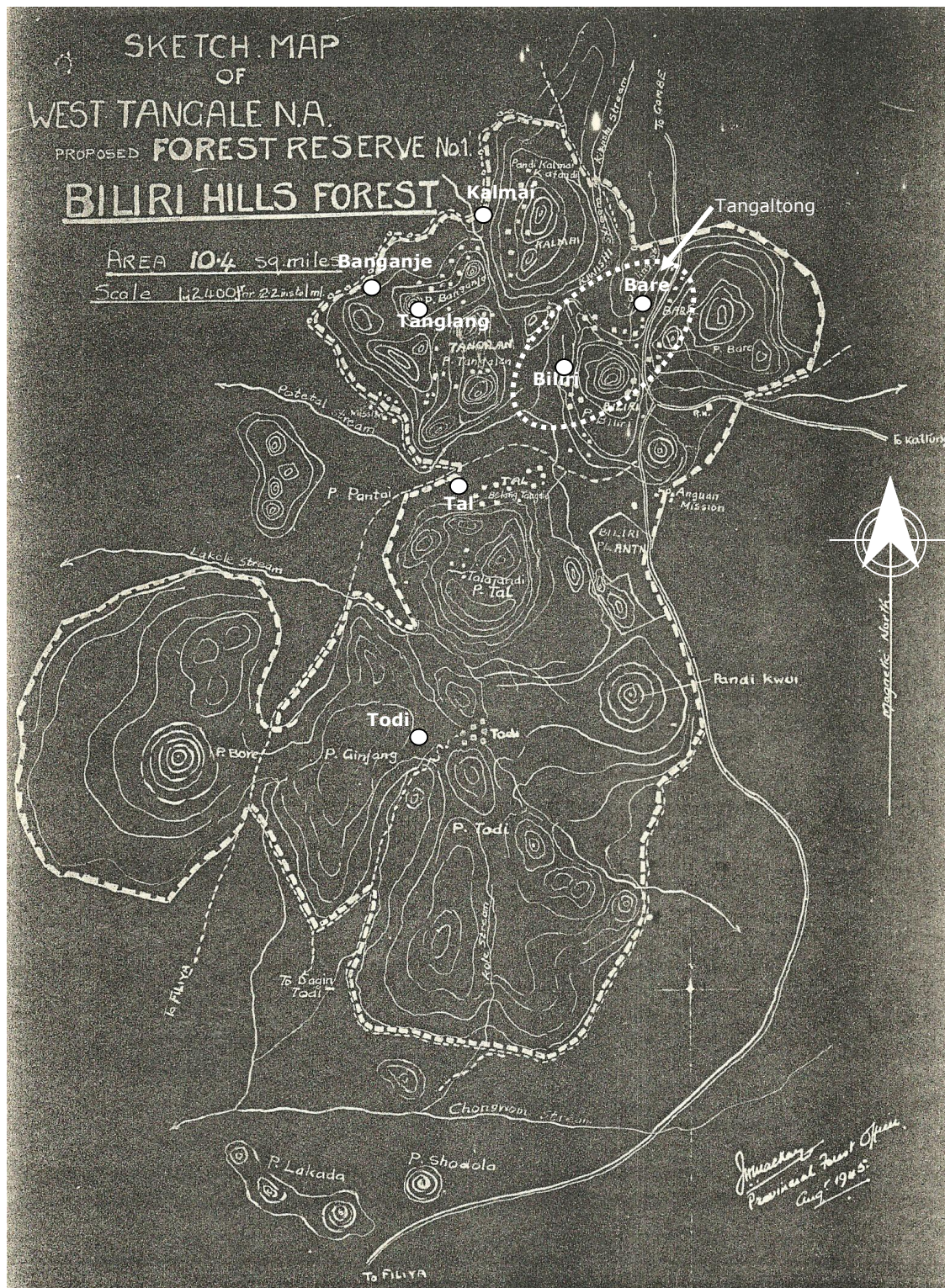


Figure 5.4: Map of initial Tangale hill settlements showing areas occupied by each of the clans. Note there are only six settlements; Nathe, scattered among them makes up the seventh clan. Source: Tangale West Native Authority Public Notice No. 104 of 1951

The next settlements after Tangaltong to be built was Tal followed by Todi. For this reason, Tangale people sometimes refer to Tangaltong as *Yila*. This means the first-born son. Tal is *Mela* the second son while Todi is referred to as *Lamela*, the third son. This is done to show the hierarchy of settlement on the hills. Incidentally, this nomenclature is still in use by the majority of Tangale clans and families in naming their sons. I met several first, second and third born male children named *Yila*, *Mela* and *Lamela* respectively during the course of fieldwork. These are default names and the most common in the land. A similar system exists for female children⁵³. This is "one of the methods they use to keep their identity, the cultural and traditional name given to each child" (Kure 1987:8). Other towns and settlements came about due to the dispersal of *Nathe*.

Legend has it "*Nathe* dispersed due to a particular circumstance in their history" (Wali 2011:16). As the story goes, people in *Nathe* had yet to witness a burial ceremony in their midst. They only went to condole people from other clans and apparently longed for the experience. So they made an idol in the form of a man and wrapped it in burial clothes, keeping it in a particular hut. They then began to let out wails only heard of when someone died. Their neighbors predictably gathered in large numbers to offer condolences as expected. This was a puzzling incidence to all as no one had any idea who exactly had died within the clan.

Not long after this, one of them fell ill and in less than three days died. They wept bitterly but while still in mourning, another person fell ill and died. And another and yet another. Death thus became a plague within the clan. If a person caught the fever, they usually died within three days. If the patient survived, he or she would spend the next twelve months recuperating indoors. For that reason, they named the plague/fever *swat*

⁵³ See *Appendix 5* for names given to children in different families across the clans.

dul. This means hit by a chill in Tangale. The phenomenon so disturbed people in *Nathe* that they started implementing some drastic measures. They stopped meeting together in one place. They stopped wailing and mourning when someone died and even stopped venturing outdoors at night. But alas to no avail, the plague persisted. They therefore started leaving the vicinity one after another, resettling among their neighbors. This included the *Kwawuli* family, who having realized what was happening, also packed out of their settlement to avoid the plague. Likewise did the people of *Long*, who believed “the thing that circles around the house to the backyard is usually intended for the interior of the house” (Wali 2011:17). The people of *Long* consequently resettled near the family of *Barem-Tai*, after some negotiation. The incidence, which necessitated this negotiation, involved a designated area reserved for the men and elders of *Barem-Tai*. It was customary for each family in Tangale to set aside an area where kinsmen would relax after coming back from the farm and discuss issues regarding the family. This was known as *tibilto*. Earlier on, the people of *Hankali* had advised the family of *Barem-Tai* to relocate and move closer to them. The advice was heeded. When the people of *Long* came along in the course of their flight from the plague of *Nathe*, they settled around the *tibilto* of *Barem-Tai*, who then insisted that they would remove their tree. To settle the matter, a goat was proffered the people of *Barem-Tai* in lieu of owning the shaded area. *Tibilto* was an important feature of the traditional life on the hills and is still evident today. Walking through a footpath in Billiri one afternoon accompanied by an informant who was taking me to visit a relative for an interview, I noticed a group of elderly men sitting under the shade of a large mango tree. On enquiry, he told me a death had occurred in one of the Kanthali families and the men were receiving condolences at their *tibilto*. He joined them after seeing me off. Five days later, we passed

the same tree on our way to another compound. I noted children frolicking under the tree with no evidence of the sombre gathering days earlier.

"Oh, the three days of official mourning and receiving condolences are over. Tibilto is not the physical tree you see, it is more an established institution consisting of elderly or mature men in a particular family who sit under a designated shady tree in front of the house of the eldest or most respected man for serious deliberations or for leisure. In the olden days, this included issues regarding quarrels, hunting, food distribution or marriage. Nowadays, tibilto mostly convenes to receive condolences in the event of a death in the family. Younger men in the same peer group also often meet at tibilto after work, but this is usually for leisurely purposes".

Not surprisingly, trees and wooded areas feature prominently in and around most Tangale settlements (Plates 5.1-4). This prominence is reflected in the adage *"pit' ukko, tibilto ukko"*. A tree or family council has fallen; an important clan or family member is no more.



Plate 5.1: Farmlands around Tangale settlements. Source: Fieldwork, January 2011



Plate 5.2: Typical Tangale settlement: approaching Billiri from Pandikungu on a laterite road. Source: Fieldwork, January 2011



Plate 5.3: Typical Tangale settlement: Pandikungu. Source: Fieldwork, January 2011



Plate 5.4: Typical Tangale town: Komta. Source: Fieldwork, January 2011

Wali (2011) narrates that the establishment of the remaining three clans of Tangale, which include Kalmal, Tanglang and Banganje came about due to this relocation and scattering of the people of *Nathe*. But the clan was not forgotten as they are considered one of the seven clans of the community, which include Tangaltong, Tal, Todi, Kalmal, Tanglang, Banganje and *Nathe*. Collectively, these form *tul Tangle peleu* or the seven roots and origins of Tangale.

a) Tangaltong

Tangaltong is considered the first Tangale clan, comprising of Bare and Kanthali-Pandi. The latter is now known as Biliri (with a single l) distinct from Billiri, the name of the administrative headquarters of Billiri LGA.

i) Biliri

The overall ruling house of Tangale resides in Biliri. The first *Mai Tangle* had established a council, *Kwaddiyyo*, which was the highest and most respected council in the clan. Mallam Yakubu, an elderly informant explained that *kwaddiyyo* was situated under some designated trees between areas inhabited by Tal and Bare on the Tangale hills. "A respected elder represented each family within the clan", he added. *Mai Kanthilang* was the only other member, aside *Mai Tangle* who could speak at such gatherings even though he had no family under his jurisdiction. His authority within the clan came from his position within this council. Several sources present the lineage of the Tangale ruling house as follows: *Mai Giu, Mai Tangal, Mai Somboro, Mai Asonong, Mai Akwi, Mai Wuni, Mai Mela, Mai Dula, Mai Sheru, Mai Billam, Mai Wana, Mai Yamba, Mai Iliyasu, Mai Muhammadu* and the incumbent *Mai, Abdu Buba Maisheru II*⁵⁴ (Wali

⁵⁴ Although records show that all through history, no other clan had contested that they shared the ruling house with Biliri, problems arose in the 1990s which to put this to the test, an issue which caused a prolonged delay in appointing the incumbent *Mai*.

2011, Kure 1987, Attah 2004). The people of Biliri mainly reside in Billiri. Other village settlements inhabited by the clan include Dongol, Payi, Amutha, Lawiltu, Lakwene, Lasale, Ladongor, Lakwalak Biliri, La'ibo, Begle, Lawalam, Kumana, Posiya, Taldaju, Kwiba and Kalindi (Mela, 2004).

ii) Bare

The sub clan of *Hankali* were believed to be the first to settle in Bare (Wali, 2011). Others joined them later. It was after the clan had been established that a ruling house emerged from one of its families, that of *Da'anta*. The first ruler from *Da'anta* was *Komok*. He assumed this position after distinguishing himself mysteriously when he escaped being killed in an ambush set up by his enemies. This gained him so much respect in the clan that one day when people were coming to greet and sympathize with him, a man from *Lakwomta* placed a crown as a sign of authority on him made from leaves of a locust bean tree. That is why the Tangale say "they've tied his hands with leaves of the locust bean tree" to describe a man selected for honour. Indeed not long after this, *Mai Tangle* established *Komok* as head over Bare. When the time came for him to perform the official vote of thanks, he invited his friends from Tera, a neighbouring tribe with whom the Tangale are believed to have journeyed from Ngazargamu. Wali (2011) narrates that the history of this association dates back to when *Komok* had worked on a valuable piece of advice they had given him on modalities to unite the entire Bare community. This was to be accomplished by according titles and official responsibilities to respected individuals from all families within the clan in order to make everyone feel part of his leadership and ensure loyalty. The advice proved astute. The rulers of Bare from *Da'anta* thus were *Komok*, *Tultuji*, *Awika*, *Kullo*, *Lasuru*, *Kotting*, *Bolto* and *Mai Umaru*.

Tradition has it that the 5th ruler, *Lasuru*, later relocated to Kembu, together with his followers after another ruler emerged from within *Da'anta*. This other ruler, *Lankanthilang*, had his title conferred on him by the then ruling Fulani Emir of Gombe. This happened when he disappeared from the sight of the Fulanis after making sure they had sighted him on an outing. Being an uncommon thing in those parts, the Emir told his subjects to approach *Lankanthilang* with care and with good intentions when they next met. And sure enough when they did, they brought him before their Emir, who was impressed with him. He inquired if his people already had a ruler and obtaining an answer in the affirmative told him he would be his *Galadima*. From then to present day, this title has remained in the family of *Da'anta Pobata*. The *Galadimas* of Bare include *Lankanthilang Kalfindi*, *Songuwa Lankanthilang*, *Yila Asile*, *Fawu Lauma'nji*, *Mohammadu Fawu*, *Mamuda Maipandi* and *Adamu Muhammadu* (Wali 2011:36). For the reason proffered above, *Mai Lasuru* felt there should not be conflict between two rulers from the same family, so he moved away and resettled in Kembu⁵⁵.

Mela (2004) notes the people of Bare today inhabit the following towns and villages-Komta, Pandikungu, Kwalipandi-Amoyo, Kalkulum, Pisiuko, Pagla, Latoddo, Polido, Lawisilapandi, Pokwangli Bare, Sikirit, Tangji, Awai, Kenthengereng, Begle-Lawisilapandi and Kalindi. *Plates 5.5-6* illustrate the *Galadima's* official residence and a nearby street in Bare.

⁵⁵ A town in present day Akko LGA, north of Billiri.



Plate 5.5: *Galadima's palace, Bare*. Source: Fieldwork, December 2011



Plate 5.6: *A street in Begle area, Bare*. Source: Fieldwork, January 2012

b) Tal

The name Tal means far in the Tangale language. Several families founded the clan, the first to settle on the hills being *Bekeri*. Legend has it they settled in an area around a hill called *kilang*. This name, as frequently found in the Tangale language, is descriptive. It combines two words-*ki*, which is similar in sound to the word meaning head and *lang*, which means early. Wali (2011) narrates that when they first arrived the area, they thought it best not to move beyond the protective barriers afforded by the hills as the area looked secure. So they deliberated amongst themselves around which of the hills they would settle. One of them looked up and remarked under that one which was the first to rear its head, the most visible and highest peak. They thus settled there (Plates 5.7-8). After waiting a while for the others to arrive, they noticed fire some distance away. So one of them decided to go and make inquiries. To his amazement, it was indeed their brothers who advised them to move closer to the other families who eventually formed the clan of Tal. These families include *Ankarat, Bekeri, Buye, Dwale, Damburam, Dwatangko, Kalbore, Kalfelle, Kolong, Kilang, Kunjang-Buye, Lapugo, Layalang, Mwa, Pawur-Buye, Pidingkulong, Posangye, Mangandara, Tuldukka, Tal-Pandi, Tuwa-Buye* and of course,

Nathe. The history of their ruling house is traced to a young boy who was divinely rescued from an accident. Earlier on when the people of *Bekeri* settled around their kin on the hills, their children were fond of playing at the top of this peak, and had discovered an easy path leading to its summit. One day, a young boy went further than usual and climbed a cliff on the windward side of the hills where strong winds were quite common. Inadvertently, he was thrown down and was only saved from plummeting to a sure death by holding on to some shrubs sprouting off the cliff face. Being early in the day, no one heard his cries until late afternoon. Only when the adults had returned from their various farms and were refreshing themselves did one of them hear the sound of a crying child afar off. They all became quiet and sure enough, all could hear the boy's wails. They traced the voice until alas they saw him hanging high up on the cliff. Climbing one onto another, they rescued him, exhausted but relieved. They brought the young lad and presented him before their elders, who blessed him with the gift of long life and conferred on him the authority to rule. His descendants, who formed the ruling house of Tal include *Kanumbu Timza*, *Sulutu Launatine*, *Lakambe Sulutu*, *Anampara Laukokol*, *Ahmadu Lakambe*, *Sulaimanu Lakambe* and *Shuaibu Anampara*. It was at this time that *Mai Tangle* established *Ponar*, the highest Tangale council to discuss matters affecting the people with their Shongom neighbours. *Mai Tal* was part of this council (Wali, 2011).

The people of Tal are settled some 6km from Billiri in the following villages-Ayaba (Pandi-Kuduk), Kologkwanin, Lasani, Lawampe, Latugat, Padimkude, Laberpitho, Dongor-Tal, Kiwulang, Pandikame, Pokatha, La'ibo, Lakurum, Popandi-Tal, Garinjaji, Pokuli, Kologtanga, Posulte, Kwalankwala, Amari, Kargo, Kanadi, Sabon-Layi, Lakwondo, Lakwejek, Ladklo, Ladongor-Wampe, Kambilo, Palseje, Latede-Lasuk, Popitho, Lakangan, Potede,

Kolokwanin-Besa, Kufai-Tali, Segle and Pokwel-Dwantang, 37 villages in all. Furthermore, "it is believed that part of the Tal clan migrated to Pankshin in Plateau State where they still maintain the name Tal with a similar culture to that of Tangale" (Mela 2004:2).



Plate 5.7: **Pand Bore**. Source: Fieldwork, January 2012



Plate 5.8: **Pand Bore seen from Tal**. Source: Fieldwork, January 2012

c) Todi

Dwale, the founder of Todi, was a hunter who in his travels came across a man from Tal, a member of the *Kalbore* family⁵⁶. It looked as if *Dwale* was going to eventually settle there, but for an illness which periodically attacked his young daughter⁵⁷. He therefore showed *Dwale* another place on a hill known as *Pandwale*. In Tangale, this means *Dwale's* hill. The family thus settled there. *Dwale* was then presented to *Mai Tangle*, who expressed his fears of the area due to its proximity to the neighbouring Shongom people. Per adventure, there are problems, who would then rescue him? As the story goes, *Dwale* reassured the king all will be well and *Mai Tangle* granted him permission to live there, thus establishing Todi. In due time, their neighbours, the people from Shongom became familiar with them, even coming to watch most of their activities, particularly the

⁵⁶ This probably explains why there exists a *Dwale* family in Tal to date owing to this association.

⁵⁷ This illness was most likely a respiratory problem associated with sneezing, which was believed to be dangerous and contagious.

enchancing Tangale dance known as *bit-bit*. Because the hilltop presented a restricted and undulating surface for such a vigorous and sportive activity, they advised the people of Todi to use the ground at the base of the hill whenever they held such activities. It was on one of such occasions that *Mai Tangle* was unfortunately proven right. The unsuspecting clan had gone down to dance, leaving only infants and the elderly too old to make the descent. When they were neck deep dancing, they looked up only to behold their town engulfed in thick smoke, the Shongom people having set it ablaze. The people of Todi were thus forced to relocate to another hill, *Munkani* around *Pandpino Todi* where they stayed till the relocation of the entire Tangale community in 1948. For this reason, the Tangale say “*Mining Shongom appe*”, we see each other as Shongom men, we are sworn enemies.

The rulers of Todi include *Butyell, Yaffise, Dikri, Kwindi, Anakre, Serket, Toba, Puyan, Ladobo, Alabi* and *Iliya Toyyo* (Wali, 2011). Todi lies at the border of Tangale land to the southwest. Its villages include Shela, Layer, Yansari, Lawurdoya, Laker, Kuram-Mota, Sabongari, Salipawa, Lakwillo, Lalemtai, Kedo, Sugansuga, Lakule, Latana and Popithe (Mela, 2004).

d) Kalmai

The name of this town and settlement was derived from an initial activity in the area, the gathering place of rulers or kings. In Tangale, this is known as *Pidin-kal-ana-Mai*. The name was shortened to *Kal-ana-Mai* and subsequently simply referred to as Kalmai. Thus the proverb “*Kalmai pidi kal ana mai*” describes a honourable or dignified place. Legend has it two friends from the *Kuzol* family in *Nathe* decided to leave after the plague described earlier to scout for a more suitable place to resettle. Their names

were *Lankabak* and *Lanpaling* (Wali, 2011). On the faithful day they set out, *Lankabak* carried along a red rooster on the trip. Travelling eastwards, they encountered a little hill known as *Pand-Lakabi* or *Lakabi's* hill. The area pleased them immensely. *Lankabak* tied the rooster and said a prayer for its safety. If on their return after three days they found it doing well, it would divinely mean the area was fit for habitation as they were people seeking refuge. However, if something happened to the rooster, it would signify the gods did not want them to settle there. So they went their way. On the third day, they returned and amazingly, there the rooster was, exactly as they had left it, tied to a nearby bush. Furthermore, legend has it that on sighting them, it crowed loudly. This settled the matter-they were staying. Before they moved further, a voice spoke to them from the hill telling them that nothing would indeed tamper with their stay there. Although theirs may not grow to be the largest of all towns, they would have no equal in riches and warriors (Wali, 2011). *Lankabak* affirmed their resolve, and so they settled there with his friend *Lanpaling*. It is said that no one knew the secrets of this hill as intimately as *Lankabak*. It was also believed to be the domain of a large and mysterious python, which was seen only on very rare occasions. The death of *Lankabak* was one of such. Legend has it on the day *Lankabak* died, this python made its way from the hill to the top of the hut where the body lay and didn't leave until they had taken the body out for burial. It was never to be sighted again. After the death of *Lankabak*, a man from *Jukun* befriended *Lanpaling*. This is a tribe found in parts of present day Taraba, Benue and Gombe States. The man's name was *Abiti*. It is said that on the day they met, after exchanging customary pleasantries, *Lanpaling* the remaining of the two founding fathers of Kalmai, asked him who he was and where he was going. *Abiti* replied that he had no particular destination, so *Lanpaling* invited him to stay. *Abiti* responded by saying that

he was however royalty and *Lanpaling* agreed that he continue his royal lifestyle of leadership. So, he stayed with the people of *Kuzol* and parts of *Okra*, the clan from which he came. Afterwards, other peoples joined them there, forming a town around the hill, which explains the name given it-the meeting place of rulers. Wali (2011) asserts that peoples and families that eventually formed present day Kalmi include *Kuzol*-from the original founding fathers of the town, *Lankabak* and *Lanpaling*, *Okra*-from the *Jukun/Kwararrafa*⁵⁸ ruling house who eventually ruled the town, *Kalmi'm-Tai*, *Kaltonko*, *Kanje*, *Talum-Ting*, *Kalfelle*, *Kilang-Okra* and *Tul-A'i*. The rulers of Kalmi from inception were *Abiti*, *Alaka*, *Piyau*, *Laukwang*, *Pagam*, *Laukerek*, *Abari*, *Uge*, *Bagnu*, *Yakubu*, *Hamza* and *Yusufu* (Wali, 2011). The first ruler of Kalmi, *Mai Abiti*, enjoyed a cordial relationship with *Lanpaling* and gave his background as the eldest of three sons of the ancient ruler of *Kwararrafa* kingdom. Their father, however seemed to favour his youngest son. Consequently, when the time came for him to announce his successor, the king sent the two older sons on errands to foreign lands, handing the kingdom over to the third son in their absence. On learning of what had happened, they both rushed back home, only to find that their youngest brother had fled for his life. They pursued him but to no avail-he had had a good head start. So they returned home, only to face news of their father's demise. In his haste, the young ruler had forgotten a pair of royal spears and insignia, which *Abiti* left with, travelling on until he had reached the place where he met *Lanpaling*. Due to the mutual respect and deep friendship they shared during *Lanpaling's* lifetime, he was given a special burial. This in Tangale is known as *dwon muto*, a well prepared or articulated burial different from normal burial rites performed for ordinary

⁵⁸ The *Kwararrafa* kingdom was a conglomeration of ancient tribes known for their fierce warriors whose ancestry has been traced to the present day *Jukun* peoples of Taraba State and neighbours south east of the Tangale people.

people. Thus this insignia was put on *Lanpaling's* body and was only removed just before it was buried. This became a tradition. If an old and respected man died in Kalmi, the same was done for him. This tradition only stopped after the insignia was forgotten and buried along with an old man. What remains of *Abiti's* royal heritage are the pair of spears and a silver ring (Wali, 2011).



Figure 5.5: Map of Nigeria showing the extents of the ancient Kwararafa kingdom. Note it extends to the area around present day Tangale land. Source: <http://en.wikipedia.org/wiki/File:Kwararafa.jpeg>

Kalmi, the fourth of the seven Tangale clans and the name of the town about 2km west of Billiri has the following villages-Powishi, Pobawure, Amtawalam, Pandinpe, Lakelembu, Papa, La'ataga, Popandi, La'alkome, Labeleng, Lasirong, Popandi-Sassa, Poyeyium and Pomongoro (Mela, 2004).

e) Tanglang

The legend about Tanglang is not explicit that the man who founded the town and clan, *Pandtulum* hailed from *Nathe*. Wali (2011) however posits there is enough evidence to lend credibility to the fact that he may have originated from that clan because his initial place of

residence was among the people of *Nathe*. Legend is however clear that one fateful day, *Pandtulum* was out grazing his flock in the countryside when a black kite suddenly swooped down and took in its beak a lamb. The animal, being heavy for the bird, slowed down its progress, so *Pandtulum* followed it to rescue the lamb. The kite gradually led him out to a large baobab tree where it relinquished the lamb. *Pandtulum* observed that the animal was unhurt, a fact that left him highly perplexed. Looking around, he realized that he was on a plateau and a very pleasant one to behold. Mulling over the whole event, it dawned on him that just maybe the kite, in taking his animal, had led him to this place. Looking up the baobab tree where the bird perched, he remarked, "If you picked the lamb to eat, then here, it is yours to eat, I will leave it to you. But if indeed it was divinely intended that you guide me here to resettle, then when I come back tomorrow morning, I will find this little lamb hale and hearty" (Wali 2011:26). Early the next morning, *Pandtulum* retraced his steps. Sure enough, he found the lamb peacefully grazing under the baobab tree. This confirmed that the bird had led him to the area. He then went back and started making preparations to relocate very early in the morning. It is believed the name Tanglang was derived from this action. It is a combination of two Tangale words, *Tangle*, which refers to a person from Tangale and *lang*, which means early. These were combined and shortened to *Tanglang*, which has remained the name of the town to date. *Pandtulum* then familiarized himself with the area and in so doing, found a spring. This further strengthened his resolve to settle his family there. The family of *Pandtulum* is known as the people of *Dadde* or *Miyem-ma-Dadde* in Tangale. Other families, which make up the town of Tanglang include *Kalkulang*, *Labaganje*, *Nathe*, *Kanfandi*, *Saharmul*, *Kwaya*, *Tulkwane*, *Oktong*, *Boge*, *Kwomta*, *Wubbi*, *Chew* and *Kanje*. In his

sovereignty, *Mai Tangle* thought it best to appoint the leader of Tanglang from the family of *Pandtulum* but they declined, saying they already held another important office, that of assisting the chief priest of the Tangale gods, *yekku*. The leadership therefore was conferred on the family of one of their maternal uncles, which produced the following rulers: *Yila Nate*, *Dable*, *Yila Lama*, *Yila Akamo*, *Telle*, *Lauyanlafi*, *Maibauchi*, *Kwa'ting*, *Maiamante*, *Majidadi* and *Abubakar Gaude* (Wali, 2011).

Tanglang today is situated about 5½km west of Billiri and 1km from Banganje. It has the following villages-Lausi-Tanglang, Poyali, Lausi-Kambilo, Lakalkal, Kulgul, Bassa, Kwaya, Tudu, Panguru, Gilo and Latana.

f) Banganje

Legend holds that the sub clan of *Kanje*, from *Nathe* founded this town when they came together to arrange stones for the meeting place of their elders. In Tangale, it is known as *kwara* and is located within forecourts or *tal mana*, the spaces that demarcate footpaths from entrances to compounds. I noticed several of these especially in village settlements during fieldwork. Instead of stones, large logs from felled tree trunks are arranged in a circle. This setting in *Kanje* was therefore called *kwara kanje*, meaning *Kanje's kwara*. Sometime after this, a relative of *Abiti*, *Mai Kalmai*, came visiting. *Abiti* suggested that the visitor move to the hill area where *Kanje* people lived. So he obeyed and overpowering them, he drove them a little further away, inhabiting the area along with the company with him. This earned the place the name move *Kanje*, which in the Tangale dialect spoken by the people of Kalmai is *bak ka Kanje*. It was shortened to Banganje as the letter k is replaced by g in the Tangale language (Wali, 2011). This is the name presently borne by the clan. Meanwhile, another *Kwararrafa* family moved to the area and settled with

the relatives of *Abiti* in Banganje. As both hailed from a ruling house, they agreed that accent to the throne would be alternated between them. This explains why there are two families in the ruling house of Banganje. The Jukun are reknown for their fierceness and persistence in warfare. The Tangale proverb "*Denger pilau*", bow of the Jukun denotes a man known for his persistence and perseverance. After this, other peoples joined them. These include the neighbouring *Kamo* tribe found in Filiya, present day Shongom LGA of Gombe State. Evidence lending credence to this are the number of families bearing this name and giving the same to their children i.e. the first daughter *Kamo*, the second *Molkamo*, the third *Lamolkamo*. They grew into a large town, even larger than Kalmai. The families that form Banganje clan include *Kanje*, *Kamo*, *Kwomta*, *Bormuto*, *Lambiga*, *Kwomkunjang*, *Kalkomo*, *Kalkunji*, *Kwaysemдем*, *Tulkata*, *Kandro*, *Kwaykalfilanu*, *Banganjem-Tai*, *Banganjem-Ting*, *Kaller*, *Kwaykonduk*, *Yeudi*, *Kwaykalseder* and *Nathe*. Their rulers were *Mai Lawani*, *Mai La'mpimuto*, *Mai Songuwa*, *Mai Akwai*, *Mai Yedgo*, *Mai Woring*, *Mai Talak*, *Mai Molshobok*, *Mai Kokke*, *Mai Hassan*, *Mai Yakubu* and *Mai Gayus* (Wali, 2011).

Banganje, located approximately 4km west of Kalmai from Billiri has villages which include Kwaya, Popandi, Sabon Layi, Lawurkondo, Lapensedde, Lamugu, Latur, Layafi, Lausikurangu, Lamit, Dongol, Pandi Kwallak, Lapurut, Lakukdu, Bayenting, Tumu, Tai, Pokulji, Latanda, Latu, Panguru, Langa, Lakarai and Layang (Mela, 2004).

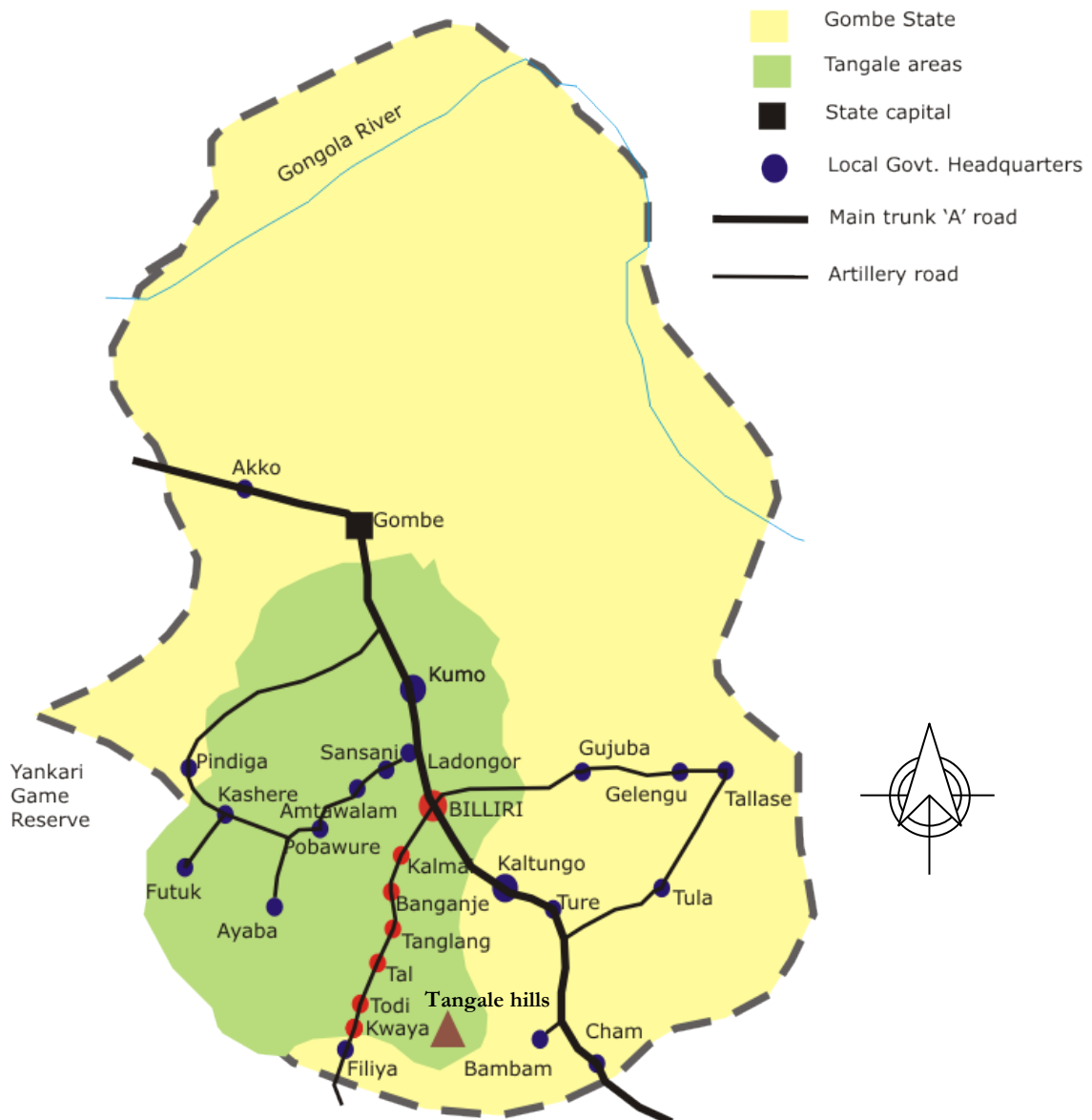


Figure 5.6: *Extents of Tangale kingdom, towns and settlements in Gombe Division.* Source: Adapted from Gwani (1999:15)

Nathe is the seventh and final clan in Tangale chiefdom. Its peoples are scattered throughout other clans. However, many still live in Tal, where they occupy a ward ruled by a ward head.

Tangale people are found in other LGAs and villages in Gombe and neighboring Bauchi States. These were “forcibly annexed to the present Akko and Alkaleri LGAs by the British Colonial Administration in the early 20th Century between 1922 and 1923” (Gwani 1999:14). Such towns and villages include Kumo, Kembu, Kargo, Kaltanga, Tumu, Pindiga, Tukulma, Pandinshori, Pandintai,

Tambe, Piyau, Pejen, Kashere, Laden, Kaklag, Baram, Labeleng, Latulkwakka, Bwapandi, Lawakwaklak, Kalkulum, Lakangang, Didiye, Poloku, Hammabani, Garin-Isa, Kwilapandi, Latethe, Kwambani-Isa, Kwambani-Garba and Tai. Tangale people are also found in Futuk, Alkaleri LGA of Bauchi State (Mela, 2004).

Technically speaking, the Tangale people share many common cultural and linguistic attributes with their kith and kin, the people of Kaltungo and Shongom, who in time past were called by the same name. Not surprisingly, the Tangale and Kaltungo/Shongom languages differ only in dialect and pronunciation of some words. They are however considered distinct chiefdoms and territories. Early accounts designated people from Billiri as Tangale West while those from Kaltungo and Shongom were referred to as Tangale East. Sometime in their history there arose some conflict, which made the communities move apart. John Hall, a Sudan Interior Christian missionary stationed in Kaltungo from 1917 notes,

“War with its many attendant evils, was yet another of the disturbing and darkening elements of the old days in Tangale. That so many of the villages lie on hillsides or among the rocks speaks eloquently of this fact . . . Eastern and Western Tangale, besides harassing and being harassed continually by neighbours on their own borders, maintained a regular system of warfare with each other. They carried on this war in regular cycles of alternating seven year periods of war and peace” (Hall 1944:9-10).

Although this cycle of warfare has since been broken, an uneasy truce exists between Tangale and their neighbours in Kaltungo as skirmishes periodically arise regarding farmland and matters relating to border demarcations. For this reason, the Tangale community generally considers areas and farmland located towards Kaltungo to the northeast along the A345 highway insecure.

5.2.2 Traditional and political structure

Prior to the advent of Colonialism, the Tangale people had an organized system of administration and leadership with *Mai Tangle*, ruler of the land or *Mai Yelli* at the helm of affairs. This structure remained in place until the British colonized Nigeria in the early 20th Century when the system of indirect rule was introduced to all provinces and areas of the country. The judicial system ran parallel to this set up with traditional councils made up of rulers of the seven clans collectively referred to as *ana mai mana*, rulers of the community. Theirs was a respected regime; they didn't amass wealth and property like other rulers of the peoples neighbouring Tangale.

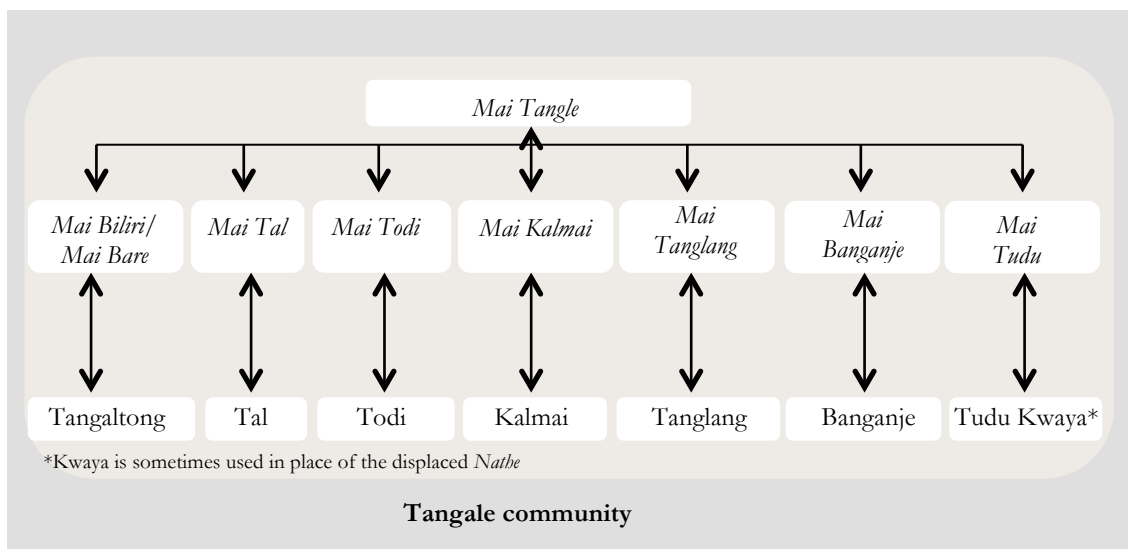


Figure 5.7: Schematic diagram of Tangale administrative structure in Pre-Colonial times.

For instance, several informants narrated there were no taxes, prisons, bodyguards, court officials or protocol to observe before seeing *Mai Tangle* or forcibly obey him.

"It was unheard of for Mai to out rightly demand that a person be brought before him. There were rules and procedures for such. A messenger would have to announce that so and so meeting would convene at so and so council. The rulers and their officials had no salaries or bursaries and there was no rule mandating anyone to pay ransom to Mai. If a person defaulted on any matter or broke a law, a

fine or penalty would then be taken to the Mai. This was the only favour the ruler received. There was no specific mode of address other than slightly bending one's neck and raising your right hand in greeting, hello Mai, or le Mai in Tangale. In times of war, everyone including Mai answered the cry to arms. The exception to this was when Mai became too old to fight".

In a nutshell, there was no pomp or pageantry attached to the throne to entice a person to be crowned king. In fact, to choose a successor, elders would meet and deliberate on the most suitable candidate from the ruling house. The one chosen would then be surrounded and the crown put on him by kingmakers⁵⁹. He is surrounded to prevent him running away. This trend however changed with the coming of colonial masters during the reign of the 11th ruler, *Mai Wana* whom they met on the throne. In their bid to implement the system of indirect rule, they altered the political organization of the traditional Tangale administrative system, making the throne look prominent and powerful through the introduction of policies such as taxation and bursaries. When he died, for the first time, two contestants from the ruling house vied for the throne, a thing hitherto unheard of in Tangale land. Their names were *Lapidda Pappalu* and *Kubbi Kwitong* (Wali, 2011). The kingmakers were said to have taken them to the British Administrator to choose who would be ruler. He is believed to have taken the hand of *Lapidda*, thus confirming him the 12th *Mai Tangle*. *Lapidda* is listed in the chronology of Tangale rulers as *Mai Yamba*.

Rulers of old had five councils that convened at different times and places to deliberate and discuss matters concerning the land (Gwani 1999). Each council had its agenda and purpose in the traditional setting. These were *Kwaddiyyo*, *Ponar*, *Kwi-Pand-Anamai*, *Pobune* and *Malkwagam*.

⁵⁹ In the case of the seat of *Mai Tangle*, the kingmakers would be from *Kalkulum* and for *Galadima* (*Mai Da'anta*), the kingmakers would be from the family of *Lakwonta*.

a) *Kwaddiyyo*

History has it this was the first council to be constituted and convened at *Kalkulum* between Bare and *Kanthali-Pandi*, the two sub clans of Tangaltong (Gwani, 1999). This council convened to discuss issues affecting only this clan. The head of the council was *Mai Tangle*⁶⁰, with *Mai Da'anta* from Bare and *Mai Kantilang* as members. Elders representing each family in Tangaltong also attended this council. It was their responsibility to give extra explanations whenever issues involving anyone in that family were raised to avoid erroneous decisions.

b) *Ponar*

This council also convened in Tangaltong on the Tangale hills. The council basically discussed issues pertaining warfare and security. In addition to the rulers mentioned above, *Mai Tal* was also a member in attendance along with elders and other people who wished to observe the proceedings (Wali, 2011). This in part explains the adage, "*Tal rukjuk Tangle*", Tal is the chest of Tangale, it is a very important part of the community and should be treated with the respect due this position.

c) *Kwi-Pand-Anamai*

Literally translated hilltop of the lesser rulers, this council convened in Tal. All the rulers of the seven clans attended the council. Issues discussed included petitions from the people of Shongom land requesting that inter tribal wars between them and the Tangale people be suspended every seven years. Supplications for a good harvest and increase in population were also offered here, with *Mai Tangle* leading such prayers.

⁶⁰ *Mai Tangle* served a dual role as ruler of Tangale land and head of the *Biliri* sub clan in Tangaltong.

d) *Pobune*

This council, instituted between *Nathe*, Kalmai and Tanglang convened to discuss issues relating ransom paid to redeem people captured in raids by other neighbouring tribes such as the Fulani. Deliberations were carried out on behalf of relatives of those captured, usually children. After a suitable price had been set, the matter would then be taken to *Mai*. He then informs *Galadima*, *Mai Da'anta* who makes the trip with an escort to find the captured persons. On locating them and paying for their release, he would bring them back into the community.

e) *Malkwagam (Ladu mor)*

This last council, situated around the entrance to the old market square on the hills at Kufai basically convened to discuss issues such as murder. Judgement was usually an-eye-for-an-eye (Wali, 2011). Moreover, it didn't necessarily mean that it is the murderer who would be killed. The aggrieved family could demand for anyone in the murderer's family to be released to them, preferably someone accorded high respect or esteem, someone the Tangale refer to as *yaddak*, a hero or warrior in his family and clan. This was where *Mai* intervened and intense negotiations were made for some form of substitution in cash or kind.

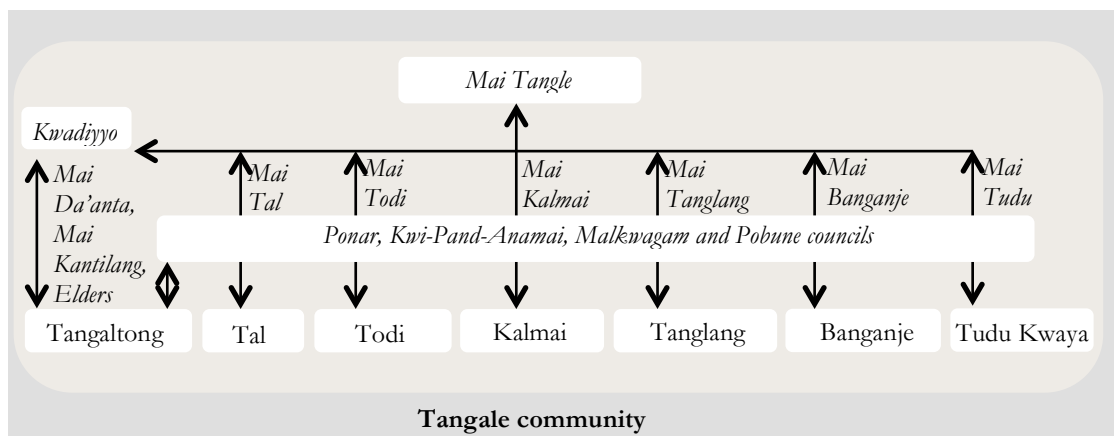


Figure 5.8: Schematic diagram of Tangale judiciary system in the Pre-Colonial era.

f) Laws of the Land

The following were crimes considered grave enough to warrant hearing and judgment by way of one of the councils-murder, oath taking, slave ransom, guinea corn marriage and marriage by exchange of brides.

i) Murder

For cases of murder, the council would first verify that the case was valid, leaving no iota of doubt that it was not accidental. If accidental, no ransom is paid. This kind of death is termed *sombom mug ta men*, the fly that fell into beer.

ii) Oath taking

For matters relating to the resolution of any argument, gods of the land were called upon to bear witness and pronounce judgment on the guilty party. *Mai Tangle* usually administered this oath or *Mai Tal* in his absence. If the disagreement was over farmland, both parties would be made to swallow some soil from the farm. If the disagreement was about farm produce, usually guinea corn, the staple crop of traditional Tangale people, both parties would be made to chew on a blade of the plant. If the argument was over the burning of a compound, both parties would have to step over a blacksmith's hammer three times. The guilty party would be struck with an illness or mysterious catastrophe soon after.

iii) Guinea corn marriage or *wul-ker-issau*

Mai Tangle did not officiate at weddings. The only exceptions to this rule in traditional times were cases involving unwilling brides. If a father presents the case of his daughter to the *Mai*, telling him that even though he as the father of the bride wants her to marry so and so, she does not seem interested, she is prohibited from marrying another man. The *Mai* would have a messenger escort the girl into town carrying a bundle of guinea corn. No one would then be able to court her and for no reason is

she to leave her husband's house in a temper. This kind of marriage is what Tangale people refer to as *wul ker issau*, marriage of tied or bundled guinea corn. It is a mandatory marriage that cannot be broken.

iv) Marriage by exchange of brides or *wul-po-kulang*

This is the second instance where the ruler of the land intervenes to save a marriage. If a father marries off his daughter to a man she does not like and refuses to have the marriage consummated, her father would bring the matter before the *Mai*, requesting for a substitution of a husband for her. With the *Mai's* permission, the father then investigates if anyone else has a similar situation in their hands but usually far in another clan. When the father successfully finds a similar situation, he would secretly liaise with the father of the other girl. If all goes well, they would inform both their respective sons-in-law about the deal. A date will then be set and both brides, ignorant of the matter, will be led out as if being taken back to their respective fathers' houses. When the two parties meet in between Tal and Tangaltong, under a designated *kulang* tree, each of the grooms will hold the hand of the other bride and exchanging their wives return back home. The girls in this instance have no right to leave their husbands' houses in a temper as there is no room for efforts at reconciliation by way of paying sums of money. In Tangale, this kind of marriage is called *wul po kulang*, marriage under a *kulang* tree. This is the reason behind the adage women sometimes use in cases of separation "Did you marry me under the *kulang* tree?" In such instances, it means the woman can go back to her father's house and the husband will have to plead if the couple is to be reconciled. Where no similar case or situation is found in another clan to facilitate such an exchange, the husband has to device a means of consummating the marriage. After this, the girl remains married to her husband.

These were instances where *Mai Tangle* intervened in offering some form of judgment on an issue. Other matters had clearly established and accepted rules, known and acknowledged by all and sundry so judgment could be meted out immediately. These include stealing farm produce and animals, adultery, rape, betrayal and punishment for animals straying into farmland.

v) Stealing farm produce

Stealing produce from the farm or granary carried a heavy penalty in traditional Tangale society. If the thief was caught, usually red handed for proof, the bundle of grain or guinea corn is tied to his hands and he is sold off to neighbouring tribes such as the Fulani, Tera or Kamo if his family cannot ransom him. Tangale laws permit that he be sold into slavery out of the land but not within the community (Wali, 2011). If while in slavery he is able to escape, he has secured his freedom.

vi) Stealing sheep, goats and other animals

If it is established without a doubt that so and so stole an animal, the owner would usually wait until evening when people were seated in front of their houses, *tal mana* or at *tibilto* before raising an alarm that so and so stole this or that. Being a quiet time of the evening, this announcement would carry through all parts of the town or settlement, permanently ruining the thief's reputation. If the perpetrator was a young man, it would be difficult to find a woman willing to marry him and if already married, his wife could leave him. From that day on, the person and indeed his family would suffer reproach in the community.

vii) Adultery

If a man is caught in adultery, he is usually given a thorough beating and left alone. If however, he dies in the process, then Tangale people do not consider it murder but *sira*, a wasted death.

viii) Rape

Rape was considered a taboo carrying gross and far reaching consequences. It has been known to cause clashes between the clan of the defiled woman and that of the rapist to avenge the woman's virtue.

ix) Betrayal

Among the Tangale people, *diwol* is a sign on a person who has betrayed another. Whenever a battle cry was sounded, every able-bodied man out of reflex become alert, jumping for his weapons. From there, he would head straight towards wherever the sound came from at any time of the day. Someone with *diwol* would roll around convulsively instead of jumping straight up. Since this usually happened in the presence of others such as his peers eating and seating at *tal mana* or at *tibilto*, elders of his family and clan would advice him to make his way right as the Tangale people believe that a man's sins are his greatest enemies. If he heeds this warning, the *diwol* would leave him.

x) Animals straying into farmlands

If animals strayed into farms especially during the rainy season when farm produce was growing, the owner of the farm has the right to beat the shepherd in charge of the animals to teach him a lesson to pay more attention where his flock is grazing. If however, it was time that guinea corn ripens, the farmer could hide within the thick foliage of the crops and with a straight spear, strike at one of the animals. This is usually a mature female, much valued for reproduction. Its owners will have to come and carry the carcass away without any fuss.

It is obvious from the narration so far that farming, kinship, social network, security and family life were at the core of traditional Tangale culture. Settlements and compounds were organized round patrilineal kinship relationships within clan areas for mutual dependence on extended families, social network and security. Closely related to these were gender roles, religious beliefs, dances, festivals and language. These are the focus of subsequent sections.

5.2.3 Farming

Farming is perhaps the most important physical activity in Tangale land and is heavily dependent on climatic conditions (*Figure 5.9*). The climate of the area is generally categorized into two main seasons-the dry and wet season. The dry or harmattan season commences after the rainy season from October to March and ends at the beginning of the wet or rainy season. This commences in April and ends in September. Most activities are delineated along these seasons. For instance, building repairs and construction, hunting, festivals and marriages are carried out during the dry months while all activities centre on farming in the wet or rainy season. "Any person who was well and did not go to farm was considered an infidel", explained Baba Sam, an informant. Farming was organized according to families and clans. This arrangement was advantageous for two reasons. It helped to marshal labour for farm work whilst providing security for households in an era of inter tribal wars and clashes. Tangale people had six types of farmland according to the distance from hill settlements. These were pasture lands, small farms for women, general family farms, near farmland for men, far off farms for mature men and forest reserves.

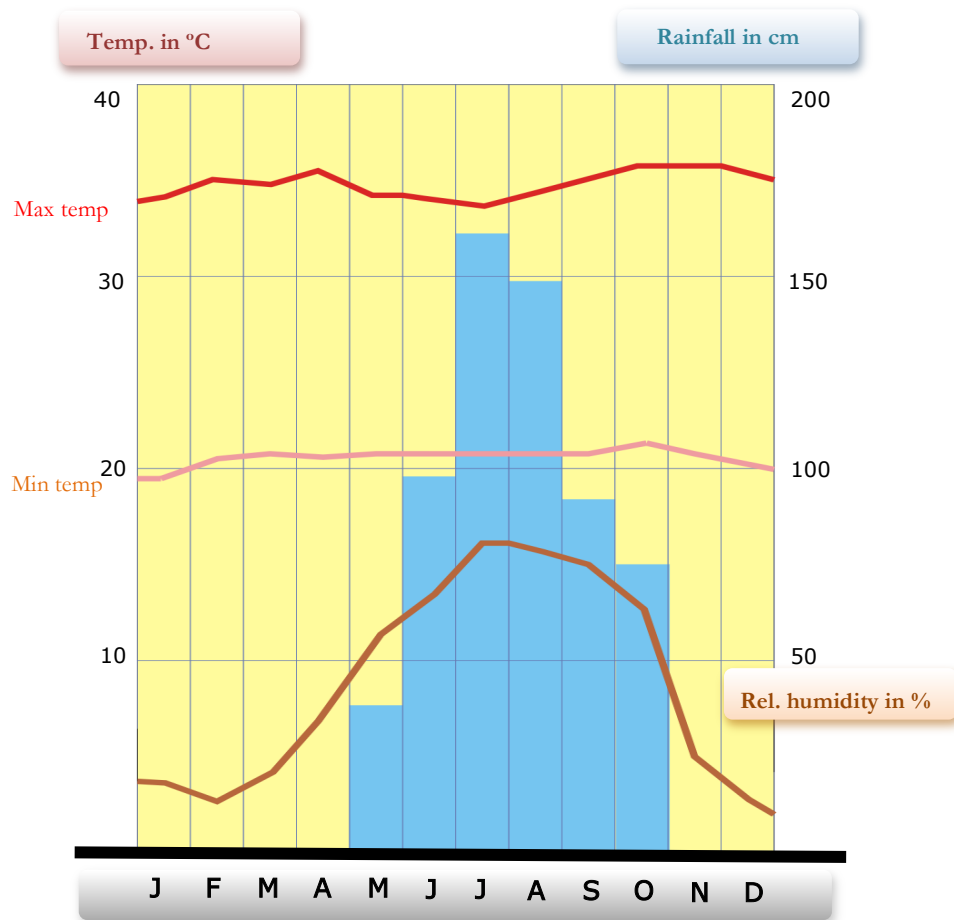


Figure 5.9: *Climatic data of the study area*. Source: Gombe State Weather Report 2010, Ministry of Agriculture and Natural Resources, Gombe-Nigeria.

a) Pasture lands or *kam-mana*

Pasturelands comprise plots found around the perimeters of towns or settlements. These were usually not utilised for farming but left fallow to graze cattle, sheep and goats by young boys between 8-12 years of age. After the boys return from where ever it was they took the animals late in the afternoons, they would tie them within these farms to graze until late evening before taking them into compounds for the night.

b) Small farmlands or *kokdik*

These lands bordered pasturelands, extending some distances up to 5km north of the hill settlements. The soil was sandy due to the hilly nature of the environment and was useful in cultivating groundnuts (*Arachis Hypogaea*). This is a crop Tangale women and other tribes in most parts of the North East are renowned for. A woman was responsible for the finer ingredients used to prepare soup while guinea corn or *sau* (*Sorghum Bicolour*), the main ingredient for staple food in Tangale households was provided by the husband, along with the occasional meat used to garnish soups. Other crops cultivated by women include vegetables such as red sorrel (*Hibiscus Cannabinus*), okra (*Hibiscus or Abelmoschus Esculenta*) and beniseed (*Sesamum Indicum*). The leaves and pods of such plants were dried during the harmattan season and stored for use literally in rainy days.

c) General farms or *lasassap*

The difference between *lasassap* and *kokdik* was not much as these just extended 2km north of the latter. However, the soils here were harder because the loamy content was higher. Thus only hardworking women cultivated these farms, though they could be very productive.



Plate 5.9: **Leaves of a red sorrel plant** (*Hibiscus Cannabinus*). Source: Sukanya's musings (2011).



Plate 5.10: **Okra plant** (*Hibiscus Esculenta* or *Abelmoschus Esculenta*). Source: Kochlar (2010).



Plate 5.11: **Groundnuts** (*Arachis hypogaea*) still in the shells. Source: Groundnut (2011).



Plate 5.12: **Beniseed** (*Sesamum Indicum*), used in garnishing cereal based meals, marriage proceedings etc. Source: Beniseed (2011).



Plate 5.13: **Red guinea corn** (*Shann' tai*). Main staple grain cultivated in Pre Colonial and Post Independence era until the late 1960s. Source: Fieldwork, January 2011



Plate 5.14: **White guinea corn** (*Shann' fe*). Mostly used for brewing local drinks. Source: Fieldwork, January 2011

d) Near farmlands or *potong*

These were the closest large farmlands to hill settlements with scattered trees and vegetation. Mature elderly men who could not make daily trips to farms far off usually cultivated these areas. They were fond of putting up temporary shelters known as *lubbo* constructed with corn stalk and grass for protection from rain and the sun when taking afternoon naps. The men rarely spent the night on these farms. They returned home after each day's work to rest and get refreshed. Trees in this region include Acacia species (*Acacia Horrida*), African ebony (*Euphorbia Pseudebenus*), Shea butter (*Vitellaria Paradoxa*), Jujube (*Ziziphus Jujuba*), baobab (*Adansonia Digitata*) and locust bean species.

e) Far off farms or *lombe*

Lombe were farms located far off to warrant men staying over extended periods of time, often lasting 2-4 weeks. Its distance and spread covered about 9km from the borders of *potong* northwards. The soils were dark, sticky and loamy. Consequently, many crops were cultivated here, chief among them, guinea corn. This was where majority of able men cultivated crops to last their families the entire year. In fact, it was expected that a responsible Tangale man farms in *lombe*. It carried with it a sense of pride. If for any reason a man could not do this due to ill health or sickness, he was greatly pitied.

f) Forest reserves or *wunthu korok*

Wunthu korok extended from *lombe* to Tangale's borders with her northern neighbours, the Fulani. These lands were not used for farming due to the distance from the settlements. If indeed it was cultivated, the household usually relocated to the area. Its main use to the Tangale people was for hunting as wild and large animals were common in the thickly wooded area. These include lions or *turum*, elephants or *yugne*, antelopes or *bobo* etc. People normally organized themselves in family and peer groups expressly for hunting in the dry season when all farm work and building projects had been taken care of. Meat from such adventures was smoked over open fires and stored in hanging baskets from circular roof supports of thatched huts out of reach of rodents or children. This came in handy for garnishing soups and other meals especially during the rainy season. For men, the most prominent crop cultivated was red guinea corn, in *lombe*. It was customary to spend days on end on the farm. This was known as *wune*. People would put up temporary shelters or *lubbo* made of corn stalk and thatch for that purpose.



Plate 5.15: **A baobab tree** (*Adansonia Digitata*). This is a common tree in the Tangale hills and area. Source: Fieldwork, January 2011



Plate 5.16: **Open pod and seeds from a baobab tree** (*Adansonia Digitata*). The white substance around the seeds was ground into a powder and used as a sweetener for gruel and drinks. Source: Fieldwork, January 2011



Plate 5.17: **Millet**, another grain used especially for gruel. Source: Fieldwork, January 2012



Plate 5.18: **A tamarind tree**, another common tree in the community. Source: Fieldwork, January 2012

Farming in Tangale land was carried out in a number of stages. First of all, the land was cleared some weeks prior to the rainy season around March and April. After this clearing of farmland known as *korot* and the first rains, guinea corn was planted along with other crops like beans (*Phaseolus spp*) and pumpkin (*Curcubitaeeceae spp*). These were for use during *wune* or in the dry harmattan season. When the guinea corn sprouted, people commenced weeding in stages, the first being *kareh*. After the crops had matured around July-August the second round of weeding, known as *kwalla* commenced. It was considered the most important activity in the farming season, thus the proverb “*an ter yakku waggo*”, the month of August

meaning this is the last and most difficult part of any work, don't give up. Consequently, any any man who didn't finish his work on time was sure to have his name inserted in lyrics of songs in jest for that season, a seasoned farmer explained,

"A man's peers could go as far as to include the name of the area left with weeds to authenticate the song. As such, it was imperative that this was finished off as at when due to avoid the ridicule that was bound to follow".

After kwalla, the season for planting beniseed, *adau* came up for those interested in cultivating it. Beniseed was mostly cultivated for economic reasons owing to difficulties in handling due to its small seeds (Figure 5.12). It was also an important commodity in marriage proceedings and its use has continued from traditional times to present day. From the end of September to mid October, men commenced *kabrang*, the final process of weeding. They did not usually stay overnight because of mosquitoes and rising damp or *dulyelli* from the saturated and wet earth between the months of July and September. After this, the people would wait for the corn to ripen, around November to mid December alongside other crops such as beans, millet and beniseed (Plates 5.11, 5.17). There is usually an abundance of food and as well as work at this time of harvest.

The effort required at the end of the farming season is employed in the Tangale adage "*sabei ponnim, sabein wuthei ka pettei*"; it is not the planting but weeding and harvesting that really matters, the beginning of any issue is not as important as its conclusion.



Plate 5.19: **Beans** (*Phaseolus* spp). Source: Beans (2011)



Plate 5.20: **Beans still fresh in their pods** (Tangale ankontulong). Source: Fieldwork, November 2011



Plate 5.21: **Pumpkins** (*Curcubitaaceae* spp). Source: Fieldwork, December 2011



Plate 5.22: **Bambranuts** (*Voandzeia Subterranea*) just unearthed. Source: Bambranut (2011)



Plate 5.23: **Jute leaves** (*Cochorus Olitorius*). Source: Randal (2007)



Plate 5.24: **Leaves of a moringa tree** or laden in Tangale. Source: Fieldwork, January 2012

Women cultivated mainly groundnuts on farms closest home, *kokdik*. They usually produced crops used to garnish soups and other foods. These include various species of beans as well as a particular specie of guinea corn known as *sau yedo*, pumpkins, bambra nut (*Voandzeia Subterranea*) and another specie of beniseed grown specifically for its very slimy leaves, called *la'aledduk*. These are illustrated in *Plates 5.9-12, 5.21-24*. During the dry season, women preserved vegetables by drying them in the sun for use on rainy days. Many of the compounds I visited had vegetables drying under the sun on woven mats within confines of open courtyards. Farming responsibilities were shared along gender lines; it was the man's duty to provide grain for the main food⁶¹. Failure to do so warranted ridicule from his peers. An informant explained,

"Guinea corn and other crops were usually transported by women on their heads from the farms after harvest back to the hill settlements. Once stored in the family granaries or wunthu, the corn was technically considered the wife's property as the man had done his own bit as far as provision of food for his family was concerned".

Women were responsible for soup and it was the pride of every wife to cook such soups excellently. Consequently, women devised different ways of accomplishing this objective according to the availability of vegetables, which to a large extent depended on seasons. Between April and June, a period known as *sigzigpidi*, the popular soup was called *buzo*. This is any soup combining ground beniseed or beans with leaves of trees like the deleb palm (*Borassus Aethiopum*) or desert date (*Balanites Aegyptica*). The latter is highly prized both for its sweet hard fruit and protein rich leaves. Its flowers are well appreciated towards the end of the season when other foods are scarce (Tree Aid, 2008).

⁶¹ Tuwo is arguably the staple food of most tribes in Northern Nigeria and is made of ground grain (guinea corn, maize, millet, rice etc) cooked with water.

Between July and September, a season known as *dulyelli*, vegetables grew in abundance and popular soups were a combination of red sorrel species known as *ansom/kodok*, moringa leaves and peanut butter. From October to December or *poyibi*, people usually revert to soups made of dried vegetables, sometimes pounded and ground into a powder. These soups were known as *kahrkare* in Tangale. Between January to March or *dwih*, people were fond of dry okra or beniseed leaves. These were sometimes garnished with beans and a particular condiment known as *wan-te-yilluk* prepared from the seeds of locust bean trees (*Parkia Biglobosa*), *tali* in Tangale (Plate 5.26).



Plate 5.25: **Prepared guinea corn, ready for the mill.** Source: Fieldwork, January 2011



Plate 5.26: **Local condiment.** (Tangale *wan te yiluk deshi*, Hausa *daddawa*). Source: Fieldwork, January 2011

Table 5.1: *Tangale activities delineated according to seasons and gender*

Season	Activities	
	Men	Women: (all seasons-cooking, food preparation, cleaning compounds, washing, instructing young girls in household work, brewing local beer, <i>men</i>)
April-June (<i>Sigzigpidi</i>) July-Sept., (<i>Dulyelli</i>)	Farm work-Men cultivate crops like guinea corn gradually supplemented by maize, beans, millet and other cash crops nowadays. Women still continue to cultivate groundnuts, rice and vegetables.	
Oct-Dec., (<i>Poyibi</i>)	Harvest of crops, preservation and adequate storage, gathering materials for building repairs	Harvest of crops, preservation and adequate storage of food in stores or cooking huts
Jan-March, (<i>Dwih</i>)	Repairs and building, hunting, communal events (like hunting in the pre colonial era), alongside marriages and political events, instructing sons in male jobs (like blacksmithing, weaving etc), discussing family/clan matters	Firewood gathering, preserving vegetables and condiments, feasts, marriages, participation at communal events and religious festivals, pottery, plastering interiors of huts/buildings

5.2.4 Gender roles

a) Women: household chores and food preparation

In a typical Tangale household, the family rises early at about 5:30 am. The wife usually prepares gruel for her husband and sons prior to their leaving for the farm⁶². A female informant further explains,

"The wife first of all cleans the hearth or robit and boils water for gruel or todo made from guinea corn or millet powder ground on a stone mill. If there were leftovers from dinner⁶³, this was warmed up and served. She and her daughters then sweep and clean the compound before fetching water usually from a river or well serving the village to wash up utensils."

The woman goes to her own farm after seeing the men off, either in *kokdik* or *lassasap*, where she spends the day in the rainy season. In the dry season, women go off in groups to gather firewood, the main fuel used for cooking. At midday, she would commence preparations towards the evening meal. If she was joining her husband on the farm which was either *potong* or *lombe*, she would prepare lunch and take it along with her. It was common for women to prepare vegetables for the evening meal right on the farm, which ensures freshness and reduces the time for food preparation at home. Other foods preferred by Tangale people include puddings, tubers, *kumbam* and *diffo*. Tangale puddings were usually a combination of maize grits, crushed groundnuts, beniseed or beans while tubers include yams, cocoyams and *fu*, a small variety of native tubers.

Kumbam is a steamed meal made from finely ground grain and groundnut

⁶² Traditionally, Tangale people have just two meals in the day, lunch and an evening meal. Breakfast was just gruel or warmed up leftovers. This was to enable them start off for the farm far away and work without any heavy meal, which they believe made them sluggish. With this active lifestyle, it was difficult to find an obese person in the community. An informant I interviewed narrated how the entire village would come to look at big Hausa traders as they travelled around villages selling their wares on donkeys or horseback because it was rare to see a fat person. With the introduction of government behind-the-desk jobs and changes in diet afforded by modernization, this situation has changed.

⁶³ *Kwandak fo* (left over corn meal) is still considered a favourite by many Tangale men today. Some informants confessed that even though they live and work in urban cities such as Abuja, the capital of Nigeria, they still enjoy this type of breakfast.

paste while *diffo* is a combination of softly cooked guinea corn seeds and beans, garnished with ground beniseed.

Meals were usually prepared within courtyards over open fire although the cooking hut was sometimes used during the rainy season. Consequently, the open hearth or *robit* is still one of the most prominent features within Tangale courtyards. All the compounds I visited had at least one. There were often several. *Robit* comprises a simple tripod of stones or inverted clay pots with wood arranged in between to sustain fire for cooking (Plates 5.27-8). Because courtyards were used for many household functions such as cooking, food preparation, washing up, eating, family living and leisure, the position of the *robit* could vary. This mode of space use is still practiced within contemporary compounds. A housewife described the process of preparing *sau*, guinea corn for a meal.

"Food preparation in the traditional setting starts with threshing guinea corn or other grains such as millet retrieved from centrally located family granaries. Thereafter, the grain was pounded in a mortar with a pestle to remove the chaff. It was subsequently washed in water using circular centrifugal motions of a calabash to remove sandy grits or particles. The washed grain was then dried in the sun over a woven grass mat within the courtyard and later ground into a fine powder using a local stone hand mill called fin. These were virtually found in every traditional compound. The entire process was necessary and though tedious was made less irksome by the small size of the guinea corn grains".

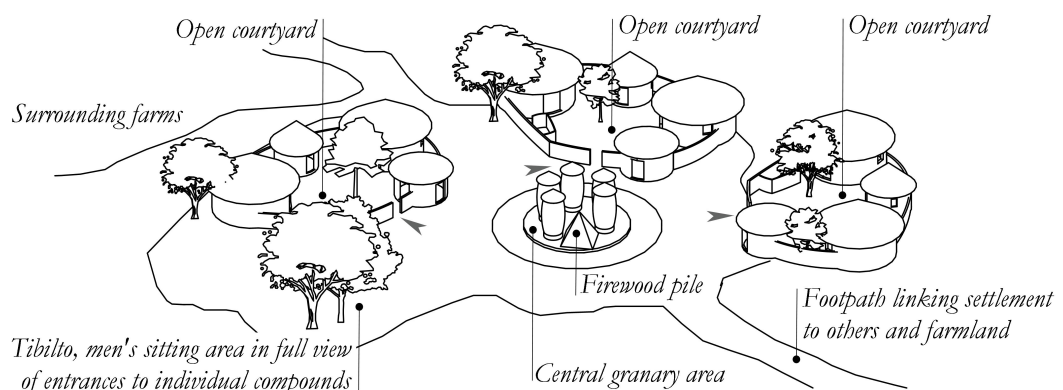


Figure 5.10: Schematic arrangement of traditional Tangale compounds



Plate 5.27: **Robit.** Pot on three stones, with fire underneath. Source: Fieldwork, January 2011



Plate 5.28: **Cooking area in a compound.** Note the array of utensils and convenience to the door. Source: Fieldwork, January 2011



Plate 5.29: **A woman preparing food for the evening meal using a mortar and pestle (tena ka ala tena).** Source: Fieldwork, January 2011



Plate 5.30: **A young school girl grinding beniseed using the traditional hand stone mill.** Source: Fieldwork, January 2011



Plate 5.31: **Large clay bowl for men (akoji).** Source: Fieldwork, January 2011



Plate 5.32: **Clay pots, pot holder (ankarat, the pronged item used to hold hot pots in place while mixing meal)** Source: Fieldwork, January 2011



Plate 5.33: *Various types of calabash*. The round item is *kubi*, used to balance heavy containers on one's head. Source: Fieldwork, January 2011



Plate 5.34: *Different types of clay gourds and calabash utensils (kuluk)*. Source: Fieldwork, January 2011



Plate 5.35: *Various types of clay pots-tekdek, keele etc used for fetching and storing water*. Source: Fieldwork, January 2011



Plate 5.36: *A mortar and pestle (tena ka ala tena) used in pounding condiments or grain for soups, gruel etc*. Source: Fieldwork, January 2011

On another occasion, a housewife whom I met preparing the evening meal, illustrated in Plates 5.37-8 described the process as follows:

"To prepare corn meal or fo, finely ground guinea corn powder is mixed into a soft paste and stirred in boiling water to cook for a few minutes. More of the ground powder is stirred into the thickened mix to attain a semi-solid consistency. This is cooked for some minutes then served with any variety of vegetable soups. Puddings are prepared by steaming vegetables, mostly leaves of the red sorrel plant before adding grits obtained from sieved grain. Salt and crushed peanuts are also added to the mix and left to cook over fire. Tubers and pumpkins are simply boiled in water and sometimes garnished with a paste of ground beniseed. Alternatively, tubers and freshly harvested corn are roasted over hot coals and eaten along with the corn meal or pudding".



Plate 5.37: **Maize grain powder** (*Yesbi shengum*). With the introduction of diesel powered mills, maize has gradually replaced guinea corn as the staple crop. Source: Fieldwork, January 2012



Plate 5.38: **Corn meal and vegetable soup**. Source: Fieldwork, January 2012

Most Tangale foods are generally prepared in this way, with the notable exception of brewing beer or *men*. This was a skill highly valued among women as the brew was imbibed during the course of many an activity such as hunting, marriage, dances and festivals. With the introduction of factory-produced drinks after independence, alcohol abuse quickly became the bane of youth in the society as it fostered delinquency and truancy. An elderly informant described the intricacies involved in brewing *men*, which on average lasted approximately five days.

"Threshed guinea corn is soaked with water and covered for three days to ensure it germinates. This is then ground into a wet paste using a stone hand mill or fin. The paste is then mixed with water and brought to boil. The hot brew is carefully collected using calabashes and stored in large clay urns to settle till evening. The cooled brew would then be put on the fire again to boil before being left to cool overnight. The following day the brew would have settled, ready for consumption. The light yellow beer with a high alcoholic content is distilled into designated clay gourds and served the compound head and his friends. This is called kwi men. In Tangale, this means the top or head of beer. The thicker sediment known as buru men was usually reserved for the wife and her friends".

- b) Men: provision of food and security, hunting, crafts, attending to clan and family matters

Apart from providing food, men are expected to protect their families in the likelihood of war. They also occasionally organized themselves in groups for hunting expeditions or *fura*. In the dry season, some were involved in crafts like leather works using the skins of hunted animals (Gwani, 1999). Being a farming community of warriors, blacksmithing was a necessary occupation and the visitor's hut or a shed at entrances to compounds frequently served this purpose. Open courtyards were basically considered a female domain⁶⁴. Another activity solely dedicated to the male gender is the annual maintenance of huts and compound walls. "This typically included preparing *attau* or woven grass used for partitioning compounds and *teshi*, thatch for roofing between December and March", a group of elderly men informed me. Older men trained young boys from a tender age. It was considered a rite of passage into manhood. "Even an orphan will be taught by the father of his friend", an ancient Tangale proverb declares. This refers to the training someone who has no father or master can obtain if he pays attention to what other men who are willing to teach him say.



Plate 5.39: *Locally produced hoes*. Source: *Fieldwork*, December 2010



Plate 5.40: *Locally produced spear heads* Source: *Fieldwork*, December 2010

⁶⁴ Men commonly utilized the courtyard for animal husbandry and maintenance tasks.

5.2.5 Marriage and family life

a) Marriage

The intricacies of traditional Tangale marriages were profound, incorporating many steps and procedures. It was foremost, not a one-man affair as it involved families and indeed entire villages at its mature stage. Consequently, it was expressly forbidden that such a relationship is contracted between relatives especially on the paternal side. Because clans are made up of patrilineally related family units, people were forbidden to marry within them. Rather, young men were expected to go out into other clans and families in order to obtain wives. This rule is slightly relaxed on the maternal divide as it was possible to marry one's cousin, providing the relationship extended to the fifth generation.

When a boy first notices a girl, he makes enquiries about her background, eliminating chances of any relationship between them. Satisfied, he pays a preliminary visit, accompanied by a trusted friend. It was common to make such a visit between 5:30 and 6:00pm. Any decent girl was expected to be busy helping her mother prepare the evening meal. On arrival, they would leave their spears by the doorpost at *tal mana* or forecourt, signifying their mission and request to see the girl's mother who inquires about them and where they are coming from. After introductions, they would state their mission and whom it was they came to see. She then directs them to one of the huts in the compound and informs the girl about her visitors. On entering the hut, the girl would retreat into the hut, while her visitors take their place near the doorway where she would observe them⁶⁵. They would then state their mission as to who among them is the interested suitor. The friend, usually not

⁶⁵ Tangale huts usually had small openings to restrict the amount of dust that can come into the hut especially during the dry harmattan season. As most activities take place within open courtyards, forecourts or *tibillo* (male communal seating areas), the interior of huts were used mainly for storage and sleeping in the rainy season and didn't need to have large openings.

emotionally encumbered, would respond, but if not, the boy himself can make the declaration. There were no hard and fast rules. Girls usually declined interest the first time⁶⁶ and if loath to discuss her objections, the suitor would excuse himself, leaving his friend; perhaps she was being shy the first time. If she persists, the young men go away to try again after a certain period of time, say three months. This process of wooing a girl is known as *dopu wula*. Alternatively, if a girl likes a boy and is too shy to let him know directly, she tells her brothers who would inform the boy's parents. They in turn would request their son to pay a visit to the girl in her father's compound. The young man would approach the girl in the same way described above to ascertain whether what he heard was true. This is referred to as *dopu wul kina*. *Kina* means money in Tangale. When the girl reaffirms her interest, she signifies it by telling the young man where she and her friends sleep at night. This is known as *want kabi*⁶⁷. Mallam Bello, another informant notes,

"The suitor usually makes his way there after the evening meal along with his peers who are also courting other girls. There, they get to know each other better and on many occasions, this has been the way others, by escorting their friends have met future brides. It was so decent, no one thought of doing anything out of place as they all safeguarded each other".

It was customary for young men to work for their prospective in-laws on the farm accompanied by gifts like chickens and fowls as part of courtship. This was one way of gaining favours from your in-laws. If the mother liked the boy, she would send a bundle of groundnuts known as *kotob* along with a calabash. The young man would reciprocate the

⁶⁶ It was normal for Tangale girls to say no to a boy the first time, so a refusal didn't usually deter young men as the girl is usually persuaded by the third visit.

⁶⁷ In most cases, this is a large hut in the compound of an elderly widow where girls of marriageable age spend the night.

gesture by sending a large bundle of guinea corn, known as *kwarak*. If the courtship showed promise, the young man would organise his friends to help his prospective father-in-law transport corn back from the farm to the family granaries. This was known as *suppo*. He would also assist in weeding, *bukka* or even in preparing the farm for planting, *fura*.

Even though a girl has invited a boy for *want' kabi*, it didn't necessarily mean she has given her word to marry him. Tangale girls placed a lot of value on their word. Once given, it is taken as a bond, so the promise to marry a young man was not given lightly. She could still decide after observing him that she was no longer interested and tell him to go his way, *ya'n merrukko* in Tangale.

Once a suitor presents a chicken and rooster accompanied by two gourds of beer and the girl's family accepts these, the matter is settled, she is now officially engaged to the boy. Preparations would then be set in motion towards customary procedures for the marriage, which include the following:

- i) The groom's father slaughters an emasculated goat that is sent to the bride's father. It is distributed and eaten by her paternal uncles and aunts. The same process is repeated after a week for relatives of the bride's mother.
- ii) Another fattened goat is prepared expressly for those within the household. As such, it is taken into the compound at night and passed over the fence. It would not be brought in through the doorway or entrance hut so outsiders were not aware of what was happening. This was known as *wam'tabulo* and is sometimes used to describe extreme ignorance, "*Ku pennan ta bulo?*" Did you come out of an opening in the house?

- iii) A fourth goat is presented to the bride's mother, known as *kome kobbo*. It is not killed, but left as a witness in the girl's family to breed.
- iv) The prospective father-in-law then sends some grain. This is threshed together with that provided by the bride's father towards producing ground grain powder for the wedding festivities⁶⁸. The bride's in-laws would then send a gourd of ground beniseed along with a well-garnished dish of chicken to the bride's family.
- v) The traditional bride price of one hundred and fifty specially made hoes or *kwas wula* is presented to the bride's family and counted to finalize the process. This number was for a young girl who was a virgin and was less for a divorcee or widow. If this was not paid, any child born of the union, *lau kenuk* belonged to the girl's family.
- vi) After the bride price has been paid, a last goat, *mar fulo* is taken to the bride's family who proceed to *yekku*, the place of worship to solicit blessings of the womb from gods of the land. This further served as a witness to all and sundry that the girl was engaged to be married.
- vii) After this goat has been accepted, the groom's family would request permission from the bride's family to commence building a new compound for the couple. This request was usually accompanied by at least five gourds of beer. Another informant explains,

"Once this permission was secured, the groom organizes his friends and relatives for the project, often accomplished within a day or two. He is then left to carve out entrances to each hut when the mud is still wet with the aid of members of the bride's family as they will inform him of the sizes of cooking pots and large urns she would come along with. These determine the sizes of doorways. Large storage clay urns were sometimes lifted over the walls of new huts prior to roofing with freshly woven thatch".

⁶⁸ The bride gathers friends and neighbours on a set day to grind grain for the wedding festivities with the aid of hand millstones, *fin yei*.

New compounds usually comprise the sleeping hut or *kabim kude*, store/kitchen or *kabin lakeyi* and a smaller animal pen known as *kabi kome*. Other huts and structures are added on as the family increases. Everything in a young bride's house had to be new-from mud for the huts to thatch for roofing, furniture and fittings such as the wooden slat bed, *inji*, stools and posts for fencing. The latter are decorated with special markings. The bride plasters the floors and interiors of the huts with the help of her friends using fine silt and clay.

On the wedding day, women from her family would gather in the bride's father's compound. She then comes out and kneels in front of them for final blessings. It is on that day everyone says what has been observed about her character, whether good or bad. She is admonished to be patient and hardworking and blessed before setting out for her matrimonial home. This is an important rite of passage into womanhood in Tangale land and is still practiced to date. The men would have made a utensil for making meal from a branch of their family tree or *tibilto*. This is presented to the bride by way of final blessings. After thanking them, she is led out, amidst her aunts, together with the party bearing her things straight to her new home with songs and much dancing. She is usually given a fly-switch made from a horse's tail and on arrival, is received by elders from the groom's family who offer chickens which are accepted by her brothers bearing her belongings⁶⁹. From then on, various activities of the wedding party commence. These include sending out grounded guinea meal accompanied with a local condiment to all the groom's relatives and neighbours usually accompanied by a little gourd of locally brewed

⁶⁹ These, numbering up to ten, would be slaughtered on their return and the meat eaten under the family tree (*tibito*) of the bride's village to commemorate her marriage.

drink. These festivities often last three days and are full of dancing and merry making. The bride's father-in-law then presents her with grain, which is ground for consumption during the proceeding weeks, as she continues to receive visitors in her new home. It goes without saying that traditional Tangale marriages demanded much especially in terms of food. After the initial batch of grain had been exhausted, containers sent to the groom's relatives are returned, usually full of more grain and other items such as beniseed and locust beans. A prudent bride manages these items pending the time allotted for other women in the family to thresh and grind grain from the family granaries.

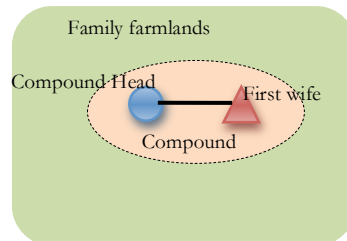
A woman traditionally belongs to the clan and family of her husband and she remains with them even after the death of her spouse. "Women were considered the property of men and wives were inherited by the clan after the death of a husband", noted Baba Eli, another informant.

"If a man was displeased with his wife and wanted to do away with her or even sell her off to other tribes, her family had no say in the matter if he had fulfilled all customary requirements before marrying her. This has changed over time with enlightenment, education and legal structures in support of gender equality".

In the event of death, a young wife would be given in marriage to her late husband's kin. This arrangement is referred to as *wul koloti*. However, any child born of this union belonged to the new husband. The child would remain with her in her late husband's compound, thus her stay in the family only ended upon her death. Since most compounds consist of huts inhabited by members of a family, one would enter a compound and immediately know when only a widow remained within a compound, especially in the first year when the mud from her husband's hut had not yet been used to construct

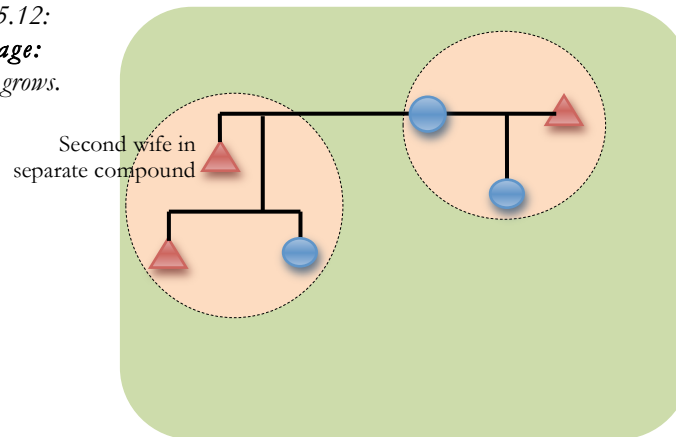
another dwelling. As her married daughters live elsewhere, huts inhabited by her male children would be seen often just out of the low walled compound within the family farmland.

Figure 5.11:
**Traditional
Tangale
households,
1st stage:**
Household
formation



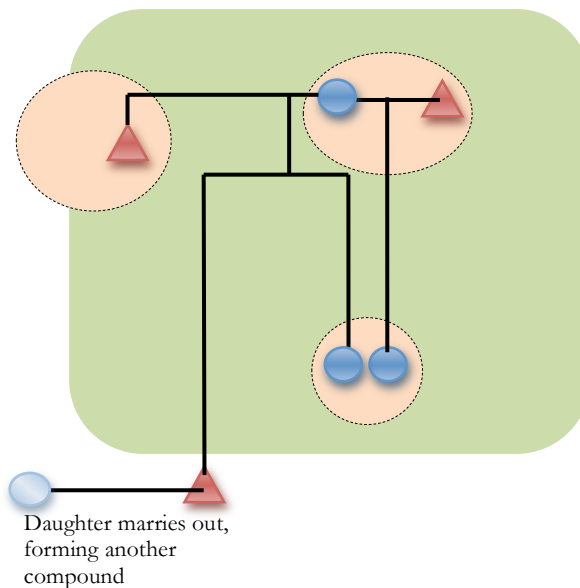
The marriage between a man and a woman starts a family and establishes a new compound. This compound is usually within the farmlands of the man's extended family and settlement.

Figure 5.12:
2nd Stage:
Family grows.



With the addition of a new wife(s) and birth of children, the family grows. A man however cannot keep both women in the same compound, they live far apart, and sometimes not within the family lands. The growth of the family is however physically evident with the building of extra huts within both compound walls.

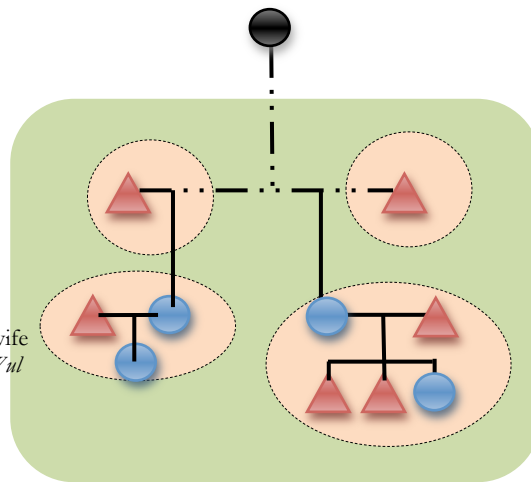
Figure 5.13: **3rd
Stage:** Family
extends



The children are now mature and the boys move out of the compound into their own but within the family lands (which could serve as starter huts when they get married). The girls marry and leave the area, sometimes the entire village or settlement.

Figure 5.14: 4th
Stage: Death of
 compound head,
 formation of new
 households by his
 descendants.

Younger wife
 marries (Wul
 koloti)



Compound head dies, leaving two widows. The boys marry but live within the family farmlands in their own compounds. Their mothers could remarry (as the case with the second and younger wife). However, she doesn't pack out of her matrimonial home, but raises whatever children she may have with the man she married.

b) Childbirth

Tangale women in days past didn't stop work such as going to farm or fetching firewood from the bush during pregnancy. As a result, many children have been born far from home in the woods. Under such circumstances, other women of the family who are with the mother would stop whatever they were doing to bring mother and child home safely. Once inside her hut, the new mother is not allowed out as well wishers visited the compound to congratulate her on what was considered a triumph over the grave. This is the explanation behind the proverb "*Pur tikutgo dodok*", their graves are now separated, a pregnant woman has safely been delivered of her baby.

As soon as a child was born, care was taken to protect the cord, which is believed to safeguard life. Wali (2011) narrates if the child was a boy, his blood was mixed with a special medicine and lightly smeared on his tongue, accompanied by supplications he grows up into a fierce warrior. If a girl, the same kind of mixture was made and smeared on her forehead just below the hairline, with a prayer for wisdom, beauty and cleanliness. When the cord fell off, the infant was named early in the morning. For a male child, another boy aged 7-10 years would be called in

to hold the baby and say a special prayer for good statue and stamina. In future, the young lad would be the errand boy to the one who prayed for him. Tangale names are given according to the clan and sequence of birth and this is one way of maintaining the culture to date. For example, in Tangaltong, the families of *Kantalim-Tai*, *Kantalim-Ting*, *Bekle*, *Lapandin-Peh*, *Latuldwang*, *Labwini*, *Keleng*, *Dongol*, *Da'anta*, *Barem-Tai* and *Hankali* name their daughters *Bome*, *Malame*, *Ibome*, *Molbome* and *Lamolbome* for the 1st, 2nd, 3rd, 4th and 5th girls⁷⁰. Sons for most families in Tangale land bear *Yila*, *Mela*, *Lamela* and *Molmela* for the 1st to 4th positions respectively. A woman was usually assigned to look after the new mother for the next three months, as she is considered ceremonially unclean during this period and not allowed to eat with her fingers. She is expected to use a special spoon, *sara* fashioned out of the bone of a large animal like buffalo. Her husband was equally forbidden to eat the same food and would have to move out of the hut they share, having no relations with her until the child was weaned. "This period could take up to two years", a woman in the community informed me. Elders in the family would take care the husband didn't linger around his compound especially if he was a young man to prevent another pregnancy. The mother was allowed to start some light basic work after three months and a little girl from the village was usually assigned the job of babysitting the infant.

Families in Tangale land were polygamous prior to the advent of Christianity as men married more than one wife for children and for harnessing farm labour. Children were difficult to obtain and it was common to see a family of two to three wives raising just three or four children. Not every woman was guaranteed a child. The reasons for this

⁷⁰ See Appendix 5

have been given as the rampant prevalence of diseases, ascribed then to evil spirits. An informant explained,

"In order to nurse a baby to adulthood, many parents had to relocate to a neighbouring town to escape the spirits as it was common for a woman to give birth and subsequently loose as many as five to six babies. This is one explanation for finding families who have settled in clans not traditionally belonging to them".

5.2.6 Religion and beliefs

Initially, Tangale had no official religion from their sojourn in the East. Everyone did what suited him according to what he grew up and saw his ancestors doing. Some among these ancestral modes of worship or *wa'm pi mana* had widespread acceptance (Plates 5.41-42)⁷¹. These include *takme*, *sokomwe* and *yekku*.



Plate 5.41: *Wam pi mana*. Source: Fieldwork January 2011



Plate 5.42: *Area designated for household idol worship*. Source: Fieldwork January 2011

a) *Takme*

Takme originated from Tal where it spread throughout the land due to its popularity. It took the form of possession of the affected individual and started when one youth, named Hassan climbed one of the summits of the hills around Tal settlement and was swept off his feet by strong winds.

⁷¹ *Wa'm-pi-mana* or ancestral household gods is literally translated worship behind the house. Other examples are *kita*, *chobi*, *karkar*, *sur-labi*, *kurkur*, *sur-sau* etc. Each had a particular clan or family it was associated with.

He suddenly began to see supernatural things and was instantly seized by convulsions (Wali, 2011). His peers rushed him home where an elderly shaman informed the worried relatives that a spirit called *takme* had taken possession of the boy. To appease it, certain sacrifices had to be made. He however told them it was a good omen because there was no kind of good fortune and prosperity it wouldn't bring. And so it was. The sacrifices made were relatively easy to perform. These included roasting a chicken over open fire and the spirit possessed anyone who stepped on either the ashes or bones. Furthermore, those possessed displayed amazing feats such as climbing a tree backwards or jumping head first without hurting themselves. This mode of worship thus attracted many followers. They would rub beniseed oil and spread the small white seeds all over themselves and proceed to dance, an activity well appreciated in Tangale land, which was yet another avenue to attract more followers.

b) *Sokomwe*

This mode of worship arose from the fear of rains not stopping as at when due in October for crops to ripen (Wali, 2011). So the people would beg the gods to withhold rains at this time and when the farming season approached the next year, another round of supplications would have to be made for rains to fall i.e. for the gods to lightly and carelessly or *soku-soku*, let the rains fall. The combination of the words *soku* and *mwe* produced *sokomwe*. As with anything affecting farming, this mode of worship was taken very seriously indeed and was performed once a year in April. In preparation, Wali (2011) narrates that the two officials of the worship, *Maikwalo* from Tangaltong and *Labalbaji* from Tal would notify the entire community by the simple process of passing through the hill settlement early in the morning to a place designated for the worship. This was usually *kwi-kungku* in front of *Mai Tangle's* palace in *Biliri*. Everyone

seeing them would automatically know it was time for *sokomwe*. Because Banganje, Tanglang and Todi clans were settled much further away, they usually were not able to attend. Consequently, the other clans performed the annual rites for rain on their behalf. After the men had all gathered and were quietly seated with no one talking, *Mai Tangle* would address the gods, requesting for the blessings of rain. Once done, *Maikwalo* would stand up together with *Labalbaji* and raising his hand as if throwing a spear, he would cry out for rain. The hushed crowd would then rise, everyone carrying a spear and shield and as one man head for a nearby hill known as *bakucan*. There, they would strike their spears against a tree and scoop earth with their shields and run straight back to their respective compounds without stopping to rest. "Because the distance and hilly terrain demanded a lot of endurance, it was customary for women to line the entrances to villages in order to welcome men who successfully completed this ordeal", an informant who had experienced life on the hills as a child recounts. They would then await the rains.

c) *Yekku*

"This mode of worship became the one unifying traditional religion for the people due to a circumstance that threatened the community-again, the lack of rain", Mallam Bello, another informant observed,

"Legend has it one year, the rains stopped just as grains were sprouting and a kind of worm came up which destroyed the tender guinea corn shoots. There was pandemonium everywhere. This necessitated Mai Tangle to assemble the entire community for deliberations on ways to solve the acute problem. A man from Keleng in Biliri told them he would try and urged them all to go back home quickly. Late in the evening, there was a heavy downpour that washed the worms away. Before long, everything turned green again. This is how the entire Tangale community turned to this mode of worship".

Oral tradition has it this man got his powers an area called *Lakwene* where their family farmlands were⁷². He had adopted a young lad from *Kwawuli*, who went with him to farm.

"One day, when they had stopped to rest in the hot afternoon, the boy decided to go hunting for meat they would eat that evening. Taking along his bow and arrows, he set out into the bush until he reached a clearing filled with vultures. On spotting them, he moved closer to see the carcass that had attracted them. To his surprise, they didn't take to flight, as they ordinarily should. This scared him, and as he turned to flee, a voice called out to him to come closer, his search had yielded fruit. He walked to the clearing and beheld a set of large chains. One was longer than the other and the shorter one had a ring at one end. He was asked to pick them up and be on his way along with instructions on their mode of worship as if he took care, the chains would be a source of good fortune to the entire community. He inquired whether he could present them to his guardian for safety and was told, yes, why not? He was to dip his hand in water and rub it over his guardian's face. Whatever his guardian sees will be the powers that he can use. And sure enough, when the Keleng man looked into a vessel, he saw a body of water spread out like a big river" (Wali 2011:77-80).

He thus thought it best to take the chains home for safety. On their way back, they had to cross a spring known as *lakolin*. Placing the chains on some nearby rocks, they decided to bathe, but could not find the chains where they had left them afterwards. They inquired as to who owned these lands and were told *mum-ta-bwa*. This is literally translated in Tangale people of the hole or earth, from *Kwalkwali* in *Biliri*. On approaching an elderly man from that family, they narrated their story. The man reached down and took out the chains, so the man from *Keleng* decided to leave the chains there for safekeeping. That is how the *Kwalkwali* family got involved in the traditional office of *yekku*.

⁷² This area exists to the north of *Biliri* and until recent times, was still cultivated by the *Keleng* clan.

Another clan involved in *yekku* rites is Tanglang. When one of the daughters of *Keleng* got married, her father is believed to have given her the shorter of the two chains, which was considered the female segment to take along with her as a wedding present for good luck. On arrival, she deposited them with her husband's family who guarded it with care, thus earning their place as officials in this mode of worship. Mallam Bello notes further,

"The powers bestowed on Maikeleng the yekku officiating priest were enormous. He could make rain to fall or command water to spring out of the ground or withhold it at will. The story is told of a man who had an argument with him. On his way back home, the man was heavily beaten by rain even though the man's travelling companions remained completely dry. On another occasion, no water touched the farm of an enemy of Maikeleng and even the run-off from neighbouring farms was aborted at borders to the man's farm".

With the coming of Islam and Christian missionaries in the early 20th Century, the expressions of these powers have been subdued although some of its effects are said to be still experienced to date.

5.2.7 Feasts, dances, festivals and burial rites

Feasts and communal ceremonies commonly held in times when food was in abundance at the beginning of the year after the conclusion of all farm work. It is a much sought after affair and people spent as much as a week eating, drinking and dancing, alternating between one peer or family group and another.

Play to the Tangale man was synonymous to dancing or *kollo*. These are still a people who cannot resist the sounds of traditional dances. "*Kollo* was one of the three things a man could excel in to secure the hand of the most promising maiden in the land", Fibi a seasoned dancer herself reminisced. "The other two were farming and being a warrior, *yaddak*.

Women who could dance well were also favourably looked upon". Such dances include *Bit bit*, *La-tang*, *Kwangam* and *Bel-kama* (Plates 5. 43-44). Most lyrics are in Tangale language but with the introduction of other tongues notably Hausa, it is common to hear both languages in contemporary songs. Dances featured prominently in marriages, religious festivals and burials for a very old person. The death of a child was considered too painful as the natural order of life was for children to bury their parents. There would be no dancing or merriment on such occasions and the child would be buried as soon as possible. When anyone died, the body was usually buried within the compound. This practice still obtains today. A woman was laid to rest in her husband's home unless she had performed the traditional *Tangra* rites⁷³. She is then buried within her father's compound.



Plate 5.43: *Tangale traditional Bit-bit dancers.*
Courtesy: Daniel Maina, August 2006



Plate 5.44 *Kollo Kwangam, drums for the kwangam dance.* Source: Fieldwork January 2011

⁷³ *Tangra* was considered the female version of *yekku* initiation. It involved cooking corn meal and making sacrifices of animals to the gods in the woman's ancestral home.

5.2.8 Language

The Tangale language is arguably one of the most developed aspects of the culture. Many of my informants cited this as the one thing you could use to identify someone of Tangale origin. It is also highly descriptive and concise. For example, a person's name conveyed what was considered the most striking thing or circumstance about them whether events at birth, physical appearance or wish for the child. *Yila* means the first male child from so and so clan, *Tingo* means dark complexioned, *Laudarji* means brilliant, *Kamile* means you'll live long.

Another facet where description is evident in the language is in the use of idioms and proverbs, *sam kwi idei bwolji*. Most pithy Tangale proverbs have a storyline behind their meaning that is generally known within the community. For instance, when a Tangale man says, "*Kwi sab dig ta le*", the matter remains in the grass, what he really means is the case is closed. The origin of this saying is ascribed to the story of a slave who was sent by his master to cut grass to thatch a roof. In the process, he killed an animal but hid it within the bundle of grass, *le*. On his return home, he asked his master, "If a servant kills an animal, which part of it is given him?" "The bones", was his master's reply. "The matter will remain in the grass", the servant quietly remarked. Kinsmen congratulating a man on the occasion of his marriage say, today we have our own dish, "*Teme min yaka tembele*", today we have the source of provision and supplies, a calabash. You have acquired/married a wife. To cut a man to size, the Tangale say, "*Penin lau mu*", it will be known by the son of man. Every man's performance will ultimately expose his true calibre. This is typically revealed in farming or in times of war.

Similarly, the use of the same word often conveys a completely different meaning depending on the context. *Le* for example could mean hello or grass, gentle or well depending on which verbs, adjectives or pronouns are combined with it in a sentence. "*Ma le*" is hello everyone. "*Watgo la le*" means he/she has gone to cut grass. "*Li le*" means place it gently. "*Abastamun le*", she is doing well. On the other hand, variants of a single word could refer to one concept. "*Mana*", "*la mana*", "*tal mana*" and "*la ter mana*" refer to the community, a compound or house, a forecourt/outside space in front of a compound and an open courtyard respectively. In this respect, the term *mana* refers to aspects of a single concept, home.

Many aspects of traditional Tangale life found expression in the language. Not surprisingly, the culture has little by way of symbolic representations. The only symbol, which has come to symbolize the community is a logo bearing a python coiled around a hill, whose base is dotted with seven huts. Each hut represents one of the seven clans. The logo was first produced as an emblem for *Mai Tangle* but with modern communication especially print media and computer communication, this has gradually become the easiest symbol to identify the community with (Plate 5.45-46). The designer of the logo informed me "the design became necessary as a sign of authority and diplomacy for the ruler to have on a flag in the post independence era"⁷⁴. He was contacted to propose one being a fine artist by training. After discussions with the then *Mai*, they agreed to use the python or patron spirit of the Biliri sub-clan, the *Ballin* hill and the seven huts representing the seven clans of Tangale. This coincided with preparations for the Festival of Arts and Culture in Nigeria (FESTAC) in 1976.

⁷⁴ This discussion took place in Billiri on 11/01/2011



Plate 5.45: **Logo with the Biliri patron python coiled around Biliri hill.** Note the seven huts dotted at the base of the hill. Source: Fieldwork, January 2011



Plate 5.46: **Tangale peak seen from Kufai.** Source: Fieldwork, January 2011

5.2.9 Building construction and Tangale traditional architecture

Traditional Tangale domestic architecture comprised three basic building typologies. These were huts or *kabi*, granaries or *wunthu* and shelters, *kulthur* or *lubbo*. Together, these constitute a man's compound, his *mana*, the visible expression of his cultural heritage and acceptance in society as a man without a compound was considered a child who was yet to mature enough to marry and take care of a wife and family. Few compounds I visited in the villages and fringes of urban settlements in Billiri belong to this category⁷⁵.

"Access to a compound from the nearest footpath which linked it to others was through the forecourt, tal mana or the visitors hut, kanthilang leading into the courtyard. These were mainly male related spaces. Open courtyards, la ter mana or shenga accommodated animals, cooking and sleeping huts. It was basically a female domain. Huts usually formed part of compound walls, which were constructed of mud or woven grass and cornstalk. They were kept low so that anyone passing could view the interior of the courtyard, and in this way, keep surveillance on behalf of their kin. The number of huts depended on family size, the number of wives and children a man had according to his capacity to cater to their needs. Many household activities were carried out within open courtyards or forecourts as buildings were primarily used for sleeping

⁷⁵ These are described in more detail in Chapter Six, Housing in Tangale land.

at night and for storage. Compounds were clustered together in patrilineal kin groups, which make up settlements surrounded by farmland". (Mama Ladi, an informant)

Settlements in Tangale communities were not walled. This in part explains why Tangale men generally spend their spare time outdoors at *tibilto* or *tal mana* to visually assess any foreigner or danger approaching the settlement. Whenever I went to conduct these interviews and discussions, news of a stranger within the village rapidly circulated. It didn't take long for residents to ask my field assistant where I was from before we approached a compound. This passive sense of security in the post independence era was tested in the 1990s when raiding Fulani herdsmen locally referred to as *udawa* attacked unsuspecting villages, destroying lives and property worth millions of naira. Thus the idiom "*Borollo*⁷⁶ *kadduk manei*", Fulani have swept the house, meaning there's no food to eat in the compound.

Round huts were built with mud and plastered with a concoction of grass and cow dung left to ferment for periods lasting up to seven days (*Plates 5.47-49*). The huts were then covered with a conical thatched roof. It was far easier to roof the cylindrical structure with a simple cone as rectangular structures necessitated a hip roof, which was more difficult to construct. The conical thatched roof was constructed on the ground and lifted into place whereas a pyramidal roof demanded by square or rectilinear buildings had to be thatched in place on top of the building. Baba Mela, another informant, explained the process of constructing a hut on the Tangale hills, which were made of stones, illustrated in *Figure 5.15*.

"The man in charge of the construction would determine the site of the hut after deliberating with other men in the family. He would then measure the diameter of the hut using his foot. Using a peg driven at

⁷⁶ *Borollo* is the local name for Fulani in Tangale. Several Fulani families however reside within many parts of the community as rearing cattle is a common activity besides farming in the study area. The main occupation of the Fulani in most parts of Northern Nigeria is cattle rearing.

the centre of the hut and the rope, the circumference of the hut is then drawn on the ground. This averaged roughly 2-2.5m and a shallow trench about a foot deep is dug. Poles of ker were then driven into the ground and wedged between large boulders to form foundations. The walls are then raised over the foundation using smaller stones piled one on top of another to a height of about 1.5m. A thatched conical roof is then placed over the stone walls”.

These primitive stone structures were gradually been replaced with huts constructed of mud today. Building was strictly a male affair as women were only involved in providing refreshments and plastering the interior of the huts especially if constructed for a bride.



Plate 5.47: **A new hut under construction.** Source: Fieldwork January 2011



Plate 5.48: **Base of the new hut.** Source: Fieldwork January 2011



Plate 5.49 **A freshly built mud hut ready for roofing.** Source: Fieldwork January 2011



Plate 5.50: **Remains of the stone base of a hut on the Tangale hills.** Source: Fieldwork January 2011

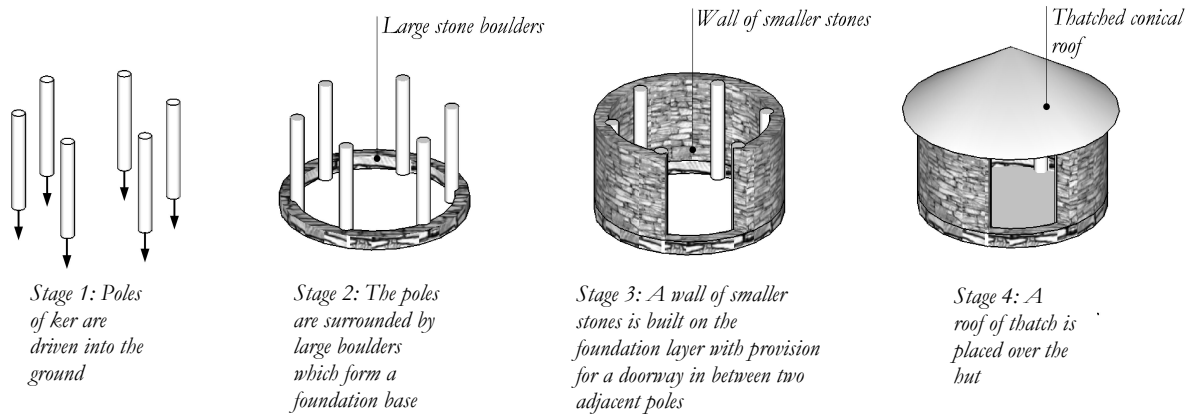


Figure 5.15: **Hut construction of stones.** The stones were not bonded with any form of mortar and huts necessarily had to be small measuring about 2.2m in diameter.

Granaries or *wunthu* were constructed in a similar way. They however had no openings except at the top as grains were deposited or retrieved by lifting the thatched conical roof, which acted like a cap (Plate 5.51). This was done with the aid of a forked branch that served as a ladder, *wira*. Granaries are usually elevated on a platform of large boulders and sometimes covered with thatch to prevent rodents attacking the precious guinea corn harvest within (Plate 5.52).

Shelters consist of a simple post and beam construction using tree branches covered with leaves or cornstalk. If it was free standing, it was referred to as *lubbo* but when built against a compound wall, it was generally called *kulthur* (Plates 5.53-54).



Plate 5.51: **Communal granaries belonging to an extended family.** Source: Fieldwork December 2011



Plate 5.52: **Raised stone base of a granary.** Source: Fieldwork December 2011



Plate 5.53: **Lubbo**. Source: Fieldwork January 2011



Plate 5.54: **Kultbur**. Source: Fieldwork, December 2011

There was little order in elements on elevations or buildings as only the necessary windows and doors featured. In pre-colonial times, these were made as small as possible for two reasons. Firstly, as buildings were mainly used for sleeping and storage, light or cross ventilation was not a major consideration. Secondly, prior to the advent of missionaries, lintels were not common. Consequently, spanning wide openings would have posed a structural problem. "The small openings and open doorways were covered with a sheet of woven grass, *attau*", another informant explained. "This ensures the fine dust so prevalent in the harmattan season is kept out of the huts".

- a) Building materials/processes
- i) Assembly, Cladding and finishes

"To build, mud was first of all dug from a selected area. If there was a collapsed hut, the earth was mixed with the new batch. Nothing was left to waste; building materials were usually recycled. When the owner was certain he had collected enough mud, a date was fixed for the building and males in the village were expected to participate in the project. As most are patrilineally related, this served as a forum for transmitting construction skills. There was little fuss about setting out in terms of rituals or orientation. However, most entrances to compounds faced footpaths or streets". (Baba Sam, an informant)

They were no special claddings and huts were usually finished with a combination of fine mud, dung and grass. In the post independence era, a mixture of mud and coal tar was used as it had become relatively available with the construction of tarmac roads embarked upon by the State government. Alternatively, cement mixed with mud was applied, even though this tends to fall off because of the poor cohesion between mud and cement. For these and other reasons, people who can afford it prefer to use hollow concrete blocks to build. This has been proven to last longer with fewer maintenance problems.

ii) Roofing

Roofs are traditionally conical, with trusses made of guinea cornstalk and thatched with at least three layers of grass. "This ensures a good overlap, which prevent leaks", explained young men constructing a roof I was privileged to observe. Ropes from sorrel plants known as *kodok* were used to fasten the roof structure. It is not secured to the hut by these ropes but by tension created at the joint between the top of the wall and the base of the roof. This process is still practiced in most villages today. *Plates 5.55-72* illustrate the process of roofing a newly constructed hut ahead of a marriage in Pokwangli, a village near Billiri. The groom joined us later in time to lift the finished roof unto the hut.



Plate 5.55: Beginnings of the thatched roof, using already piled corn stalk. Source: Fieldwork January 2011



Plate 5.56: Fixing the piece that holds the final, 'tok'. Source: Fieldwork January 2011



Plate 5.57: **Laying out the trusses.** Source: Fieldwork January 2011



Plate 5.58: **Raising the roof so circular bands of stiff bound grass can be used to brace upright members** Source: Fieldwork January 2011



Plate 5.59: **Anchoring the frame with circular bands of tied grass to serve as purlins.** Source: Fieldwork January 2011



Plate 5.60: **Rolling bound grass for bracing the roof structure.** Source: Fieldwork January 2011



Plate 5.61: **The circular braces in place.** Source: Fieldwork January 2011



Plate 5.62: **The top most ring is pushed up and the other supporting trusses tied beneath.** Source: Fieldwork January 2011



Plate 5.63: The finished roof frame. Source: Fieldwork January 2011



Plate 5.64: Spreading the first layer of rolled thatch. It is rolled three times at intervals to reduce the risk of leaks. Source: Fieldwork January 2011



Plate 5.65: The completed first layer. Source: Fieldwork January 2011



Plate 5.66: Spreading thatch at the top. Source: Fieldwork January 2011



Plate 5.67: Tying the finial with two crossed sticks. These serve as pigeon holders, so pigeons do not destroy the ropes used to sew on the thatch (it is made of a vegetable, *kodok*, which means rope in Tangale). Source: Fieldwork January 2011



Plate 5.68: The finished roof on the ground. Note the ages of the volunteers—from young boys to old men, everyone pitches in to help without being told and in this way, skills are transferred from one generation to the next. Source: Fieldwork January 2011



Plate 5.69: **Lifting the roof.** Source: Fieldwork January 2011



Plate 5.70: **Transferring the roof unto the hut.** Source: Fieldwork January 2011



Plate 5.71: **Adjusting the roof on the hut.** Source: Fieldwork January 2011



Plate 5.72: **The roof on the hut.** Source: Fieldwork January 2011

b) Integral furniture and fixtures

The most basic furniture in traditional Tangale huts is a flat bed made from a felled tree trunk smoothened up for use known as *inji* (Plate 5.73). Other types of furniture locally produced by men are the reclining chair and wooden stool. I saw several of these in use mostly by elderly men when reclining at *tal mana*, entrances or within courtyards (Plate 5.74). Women use the latter mostly for household chores. Large logs placed in front of compounds form *tal mana* or forecourt. These serve as seats with the back of trees or a wall forming a hard surface to rest one's back on after a hard day's work. In contemporary times, these seats are built up like platforms against the front facade facing streets or footpaths.



Plate 5.73: A boy holding inji, or wooden slat bed. Source: Fieldwork January 2011



Plate 5.74: Typical Tangale traditional reclining chair made of palm fronds. Source: Fieldwork January 2011

c) Services

Bathing and washing up areas constitute the sources of most waste. Consequently, these were usually located close to the back wall away from entrances to ensure the easy flow of waste into surrounding farmlands. Few latrines existed within most traditional compounds or indeed towns as people went far out into the bush to relieve themselves. This condition has improved with better healthcare and awareness in the community. As such, once it was dusk, no one left the confines of the village for any reason. The only exception to digging a pit latrine was the presence of aged family members or parents living within the compound. Designated areas for threshing in wards served as feeding troughs for animals such as pigs. Presently, these are groomed for their economical value and sold in the Southern part of the country for a good profit.

From the foregoing discussion, traditional Tangale culture revolved around clan and family values, security concerns, basic needs and gender roles expressed in the settlement pattern and spatial morphology of compounds. Land was considered the most valuable natural resource, inherited along patrilineal lines with plots on which compounds were established. The size of a man's compound was largely a function of the size of his family and basic needs of the

household. Several extended families inhabited a settlement for security, social network and harnessing farm labour. In this regard, the buildings and structures reflected the culture of the community as suggested by Rapoport (1969). Subsequent sections in this chapter describe external influences on the culture and the built environment via the advent of colonial masters in 1906, Islamic tradesmen in 1918 and Christian missionaries in 1928. The community's reaction to these events began to manifest during its relocation to the surrounding plains between 1946-48 and at independence in 1960. This is evident in changing housing and compound typologies and increase in social ills noted in Chapter One.

5.3 Advent of British colonials, Islamic tradesmen and Christian missionaries at the turn of the 20th Century

5.3.1 Indirect rule and the breakdown of traditional political systems

"The occupation of Tangale Kingdom by the British colonial administration took effect from the 19th of July, 1906 when the first expedition led by Howard arrived" (Gwani 1999:91). This introduced the system of indirect rule in the community. Instead of establishing a new system, Britain ruled through existing political institutions, "dictated by the need to streamline administrative costs as it annexed pieces of Nigeria in stages" (Hausa Cultural Orientation 2007:8). The British government made important decisions and African rulers, by partly associating with the colonialists, soon lost most of their traditional authority. The case in Tangale land was no exception. For a people who had never been conquered in war, a peaceful reception was accorded Oliver Howard, the leader of the team (Gwani, 1999). Many reasons have been postulated for this: an old legend forecasting how white creatures in human form would one day conquer the world, the news of surrender of neighbouring kingdoms or the tactful use of diplomacy which had in the past helped

them remain unconquered even by the formidable Sokoto Caliphate⁷⁷. This strange relationship became the bane of established political and administrative leadership in the community. The hitherto stable structure changed to the extent that at one point, *Mai Tangle* was put aside as the head of the community and his minister of external affairs, the *Galadima* in Bare was given his office albeit temporarily. This action resulted in a massive disregard and revolt against instituted authority (Gwani, 1999). Even when the British eventually corrected this action, the hitherto cohesive Tangale traditional institution never fully regained its prestige and power. The status of the Tangale Native court was subsequently upgraded from D to C and more heads from the seven clans were incorporated into the system (Gwani, 1999). The British later converted territories inhabited by various tribes in the area into administrative divisions, later made LGAs after Independence by successive military and democratic governments⁷⁸. Traditional rulers such as *Mai Tangle* presently get their authority from powers bestowed on them by the State but are respected in recognition of the people's culture and way of life (Figure 5.16).

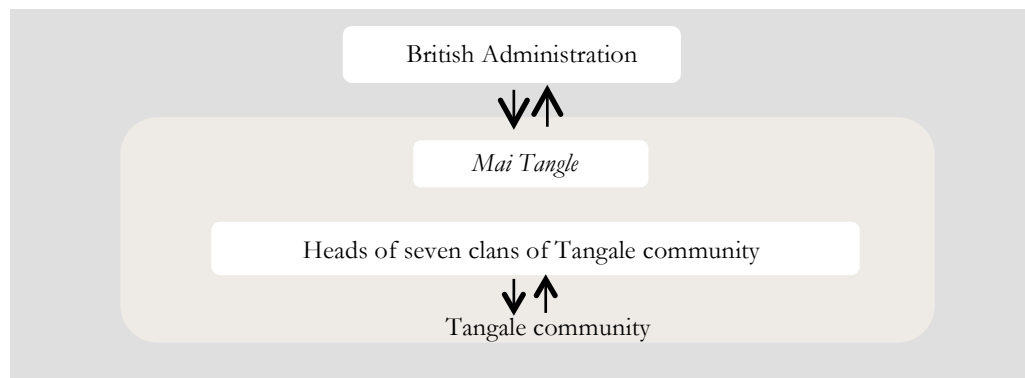


Figure 5.16: Schematic diagram of the Tangale administrative system during the Colonial era.

⁷⁷ During the first part of the 19th Century, the Fulani, a nomadic people who were influential throughout the history of North West Africa for over a thousand years, carved out two important empires (*The Nigerian jihad in historical perspective* 2012). One, based in Massina for a time controlled Timbuktu. The other centred at Sokoto controlled the Hausa states and parts of Borno and West Cameroun. Led by Usman Dan Fodio in 1804, the Sokoto Caliphate continued to rule over parts of Northern Nigeria until the British conquest in 1903 (Usman 2004).

⁷⁸ See *Appendix 6*.

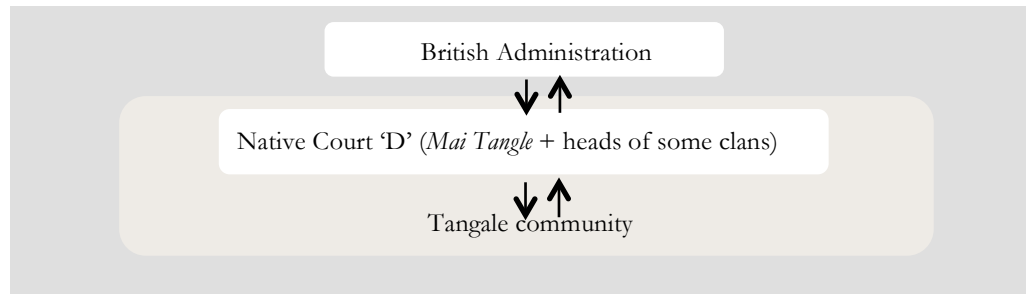


Figure 5.17: *Schematic diagram of Tangale judiciary system the in Colonial era.*

5.3.2 Introduction of foreign goods, trade and Islam

The Islamic faith was introduced into the community in 1918 through Hausa traders who settled in Bare. This probably accounts for the sub-clan having the highest concentration of its followers as the majority of Muslim faithfuls presently live there. "These traders, encouraged by protection made possible by the presence of colonials soon introduced foreign trade and goods in exchange for farm produce sold on a weekly market day, on Saturdays, *lum Tangle*", explained Mallam Yakubu. "This was established in Bare on the Tangale hills. It paved way for a gradual secularization of the erstwhile conservative hill tribe and adoption of the Hausa language widely spoken in the community today".

5.3.3 Introduction of Western education, healthcare, rectangular buildings and Christianity

Christian missionaries, coming after the traders in 1923 had several major advantages. They came along with the express blessings of colonial masters, free education and medicine. "The latter was especially a most welcome development in an era of high infant mortality", remarked Mama Mary, an elderly resident of Kufai. This perhaps explains the initial widespread acceptance of Christianity by the community. Subsequent conversions followed when people observed the peaceful way of life of these foreigners who unlike Islamic traders, lived among them at the base

of the hill settlements in Kufai. The Tangale are particularly fond of the Harlings, whom they refer to as *Pobe* and *Nune* and Dr Stirrett, *Bature mai magani*⁷⁹. Reverend Hall, one of the first missionaries stationed at Kaltungo was a linguist and a man of faith whose work on translating the Bible also left a lasting legacy in Tangale land. Through efforts of the Sudan Interior Mission or SIM, the missionaries established the first educational institution in 1938 at Kufai as part of their discipleship programme. Maikenti (n.d:1) explains further:

"The integration of faith and learning did produce positive results. Pobe Hall . . . gave us the Tangale New Testament. Bature mai magani . . . used his medical knowledge not only to cure, but also to attract crowds of people to his open-air preaching."

In time, they introduced the first rectangular stone and concrete buildings roofed with galvanized zinc sheets when they constructed the mission house and clinic, also at Kufai (Plates 5.75-8).



Plate 5.75: Pobe's house in Kufai at the base of the Tangale hills. Source: Fieldwork January 2011



Plate 5.76: The first missionary clinic at Kufai. Source: Fieldwork January 2011

⁷⁹ *Pobe* in the Tangale language refers to an old well-respected man or father. *Nune* means mother. *Bature mai magani* directly translated in Hausa language means white man with medicine, a medical doctor.



Plate 5.77: *The first Native Authority (NA) clinic in Banganje.* Source: Fieldwork January 2012



Plate 5.78: *The first church building in Billiri.* This building has been renovated over the years but the roof structure, made up of sturdy palm trunks, is still in use today. Courtesy: David Maina, April 2012

5.4 Relocation from the Tangale hills to the surrounding plains in 1948

Following the return of soldiers from World War II, the British government sent a commendation to *Mai Tangle* for sending so large a contingent to fight alongside Allied forces and the Government of His Majesty, King George VI. Many of the tribes around the North East were enlisted as *Tangale* in the 2nd World War. Subsequently the region covering present day Gombe South was named Tangale-Waja for administrative purposes for a long time before it was divided into the LGAs they are known as today⁸⁰. "The British government therefore recommended the community be provided with roads and water"⁸¹, Mallam Yakubu explained on our visit to the Tangale hills. To implement this proposal, the community was requested to relocate northwards from the highlands of the hills to the lowlands around the headquarters of Billiri LGA as illustrated in *Figure 5.18*.

⁸⁰ See *Appendix 6*.

⁸¹ This discussion took place on 13/01/2011. Documents relating to this development were difficult to access. *Appendix 7* however is a record of the British War Cabinet minutes, 'Future provision for Colonial development and Welfare' of 15th November, 1944 to that effect.

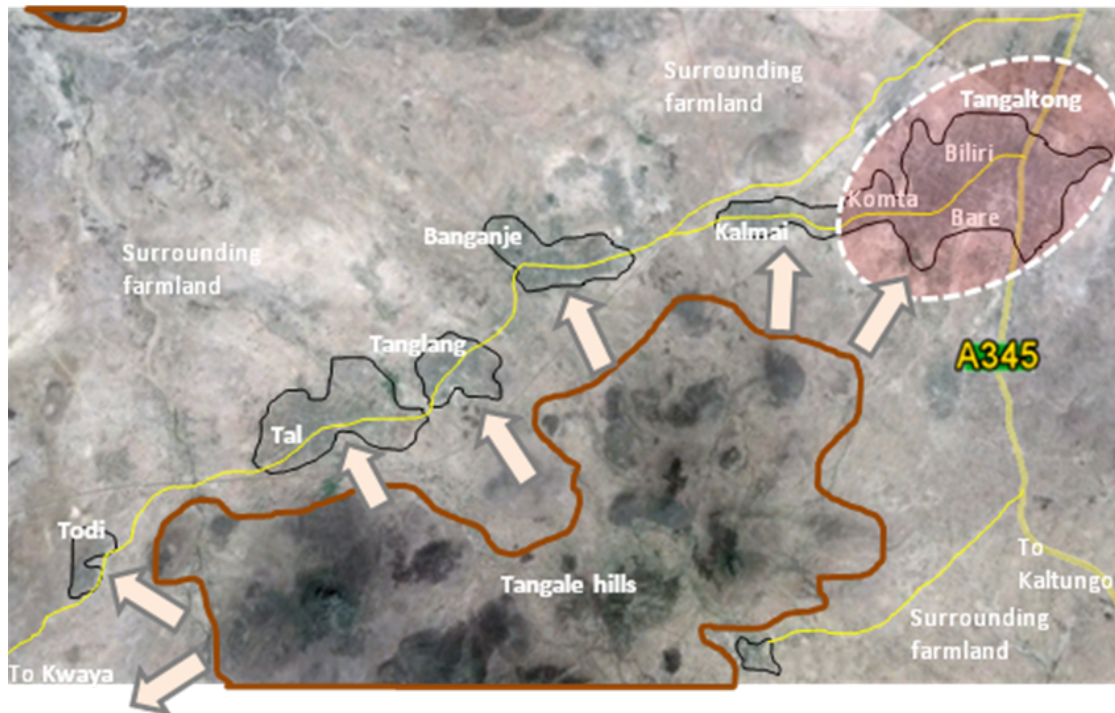


Figure 5.18: *Relocation from the Tangale hills to the surrounding plains.* Adapted from Google Earth, July 2012

In the subsequent relocation between 1946 and 1948, the community lost most of the close-knit physical structure practiced on the hills. This is evident in the transition from the organic settlement pattern of circular huts to a more linear grid pattern of roads and plots seen in developed parts of Billiri and most compound areas of walled urban houses (Figure 5.19).

"Furthermore, soldiers who had returned from the war had lost their fear of the wilds. Rather than move into the proposed town, they went all the way to be closer to their farms in potong and lombe. These are villages and settlements that still bear close resemblance to the original social structure of living according to patrilineal families and clans". (Baba Alim, a retired soldier)

Subsequently, granaries were built in individual compounds and not in central areas as obtained in pre-colonial times. Rectangular rooms built of moulded sundried mud blocks, patterned after the models built by colonials and missionaries were constructed alongside circular huts.

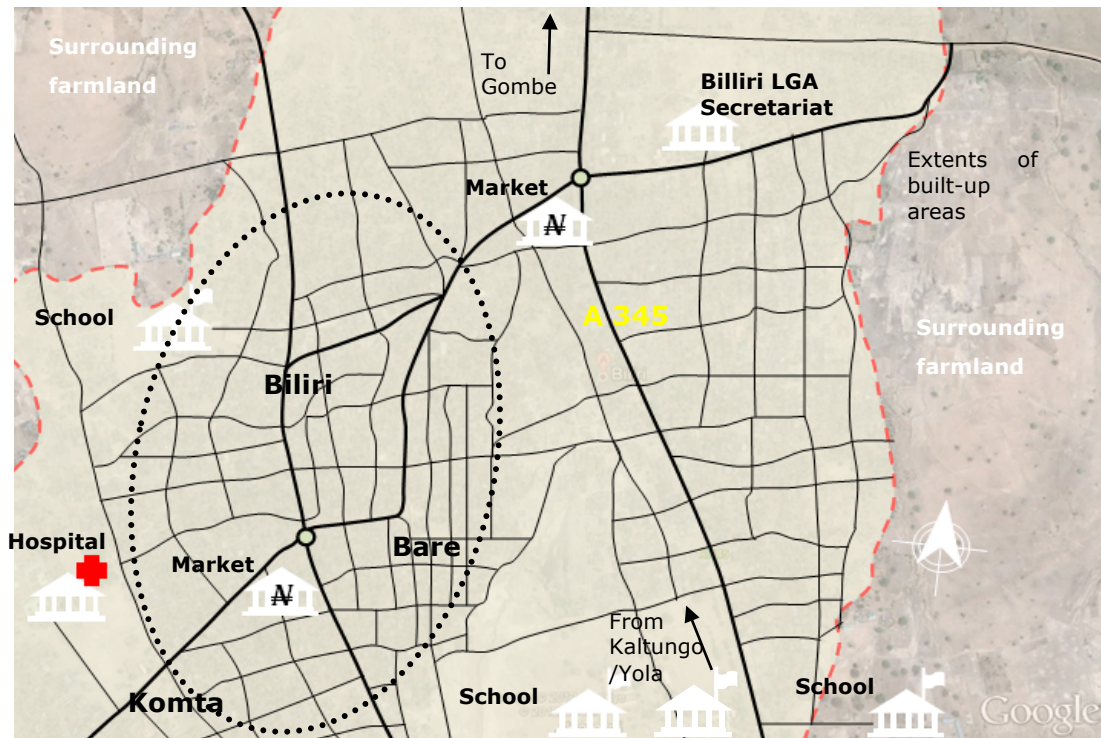


Figure 5.19: *Linear network of roads in Billiri.* Black dotted lines outline the original clan areas comprising Biliri and Bare. Adapted from Google Earth, November 2012 and descriptions from survey respondents



Plate 5.79: *Rectangular mud bricks being dried in the sun.* Source: Fieldwork December 2011



Plate 5.80: *Mud huts and rectangular rooms in a compound in Billiri.* Source: Fieldwork December 2011

5.5 Independence and Nigerian federalism from 1960 to present day

British colonial rule in Nigeria lasted until 1st October 1960 when the nation was granted independence (Colonial Nigeria, 2013). In the post independence era, decisions on governance for communities became the responsibility of State governments with policies formulated at both the executive and Local Government levels (Governors/Local Government Chairmen and the Legislature in the State Houses of Assembly respectively). This had a positive

impact on many sectors of the economy evidenced by the provision of roads, water, electricity, hospitals, free education and public housing. The latter, in form of prototype houses were constructed in Billiri.

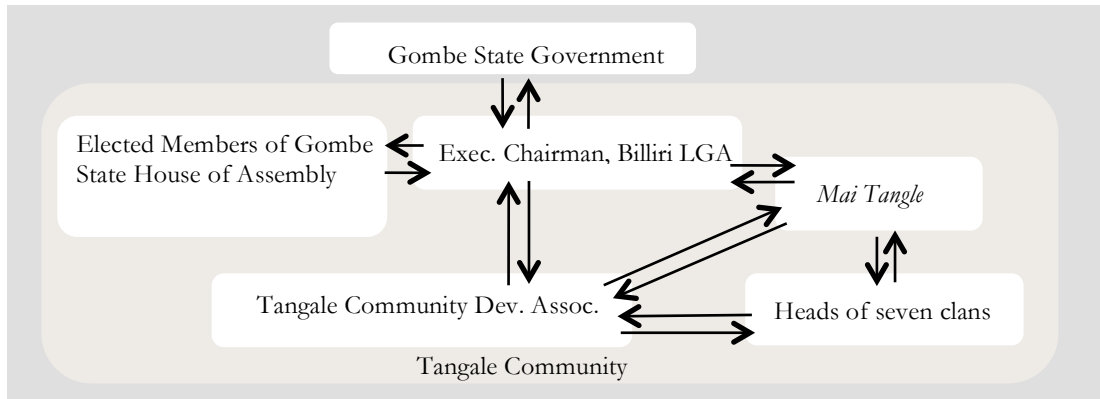


Figure 5.20: *Schematic diagram of Tangale administrative and political setup-present day. This was adopted from the system inherited at independence through successive democratic and military governance in Nigeria.*

Free education, which was established in the community by missionaries, was to create a generation of government workers employed by the State at independence. It afforded many a better livelihood in urban cities than the traditional farming practiced by their parents. By the turn of the 21st Century, many of them returning home on retirement imported the style of modern flats and bungalows surrounded by high walls into the community. These have assumed an elitist social status.

5.6 Changes in lifestyle and the advent of socially related problems

The reaction to the external events described above largely influenced changes in the lifestyle of the community and in most aspects of Tangale culture politically, socially, and environmentally (Table 5.2). This is evident by modifications in language, mode of dressing, commerce, infrastructure, kinship, marriage and transformation of housing typologies. These are linked to the observed problems relating to the loss of cultural identity, urban migration and increase in crime, insecurity, housing costs and unhealthy environments.

Table 5.2: *Main historical events, community reaction and impact on lifestyle and culture*

<i>Event/ community reaction</i>	Migration from Yemen to the Tangale hills (security from inter tribal wars)	Colonialism, Islam, Missionaries	Relocation to the surrounding plains in 1948	Independence (1960) to date
<i>Political</i>	Fusion of ideologies, strong kinship, stable political framework, one community	External influences: Fission and weakening of the political structure, pre-eminence of clan life over one community		State run community, attempts at revival of traditional custom of single communal entity
<i>Social</i>	Based on clans and relationship with kinsmen, communal way of life	Revolt against foreign authorities, clan ideology takes pre-eminence over communal lifestyle; introduction of new ways of life (business and Christianity) which influenced marriage and family life from polygamy to monogamy, establishment of nuclear family structure		Improved economy, healthcare, education and other infrastructure like roads, water etc especially in urban areas. This encouraged migration, insecurity, slums, dwindling use of traditional building skills and farm work
<i>Environmental</i>	Tightly clustered small huts in family compounds on hill tops	Introduction of rectilinear forms, new building materials	Era of experimentation; Fusion of old and new building methods	Established use of new forms and materials, individualistic lifestyles over traditional communal way of life

5.6.1 External influences on the Tangale language

Although the English language was the first foreign language introduced to the community, the most used lingua franca today is Hausa in part because it is the official language spoken in most areas of Northern Nigeria (Hausa Cultural Orientation, 2007). This has raised concerns that the Tangale language is gradually facing extinction. This assertion is reinforced by the flurry of material specifically dedicated to rectifying the situation (Kure 1987, Mela 2004, Attah 2004). Another attempt at preserve the culture is the annual Tangale Day event where songs and dances are performed and celebrated at the end of every year.

5.6.2 Dress

"Tangale people inherently had no mode of dress. Men used the leather from animals they hunted and women used a local vegetable to put together skirt-like garments and coverings", Baba Hassan explains. "With the introduction of cloths by Hausa traders during the British occupation, the people easily copied this mode of dressing, which has remained to present day". Though obviously advantageous, many of my informants

perceived this as yet another means of cultural disintegration, further fostering the loss of identity in the community.

5.6.3 Commerce and infrastructure

The introduction of trade, exchange of goods and services exposed the community to other possibilities in the outside world. Markets and shops provide residents with modern items and products and common businesses include trading, restaurants, grains, woodwork, carpentry, metal works and beer selling. The provision of roads, hospitals, clinics and public schools further enhanced the livelihood of members of the community and made life easier in many aspects.

This has however, not been without its drawbacks. The availability of factory processed beer bought at street shops fostered juvenile delinquency and insecurity in the community (Maina, 2002). "Many youth, encouraged in part by the tradition of imbibing beer, have become irresponsible", lamented an informant. People in search of greener pastures, attracted by better roads and services in urban towns and Billiri have added to the growing population of unemployed youth who have become easy culprits of crime and insecurity especially in slum environments such as Urgan and Ladukansa.⁸² As a result of urban migration from villages, government provided infrastructure such as water, electrical supply, schools, hospitals, clinics and roads have been stretched beyond their operational capacity⁸³.

⁸² Refer to *Appendix 13*

⁸³ See *Appendix 17*

"Services such as pipe borne water have degenerated in the community to the extent that boreholes or water vendors frequently ply their trade to supplement these. Federal legislators usually drill such boreholes in their constituencies. There are several of these in the community. Electricity is frequently supplemented by privately owned small diesel powered generators that emit high levels of carbon monoxide as well as unpleasant noise. This has caused discomfort especially for young children at night". (Observation by a housewife I met buying water for her household in Billiri. See *Plates 5.81-82.*)



Plate 5.81: *A water vendor in Billiri.* Note the state of the street which is typical of most streets in Billiri. Source: Fieldwork January 2012



Plate 5.82: *One of the numerous boreholes in the community.* Source: Fieldwork January 2012

Education and healthcare facilities are complemented by a growing number of private institutions and clinics in the community (*Tables 5.3-4*).

Table 5.3: *Hospitals and clinics in the study area*

S/ No	Name	Date established	No	Location	No. of Beds	Services offered
<i>State owned Hospitals</i>						
1	General Hospital	Apr. 1999	1	Billiri	150	General practice-Medicine, Surgery, Paediatrics, Obs/Gyn., Laboratory Medicine, HIV support, Ophthalmology, Anti TB
2	Primary Health Clinics	Varies	50	Most wards in LGA	Nil	Basic first aid services, stabilizing patients for referrals as necessary
<i>Private Clinics</i>						
3	Ladkwiwa Medical Centre	Oct. 1987	1	Billiri	20	Same as 1 above
4	Yamb Dok clinic	Jan. 2004	1	Billiri	24	Ditto above
5	Comrade Danladi Bako Eye Centre	Jan. 2005	1	Tal	3	Bed rest for observation, Ophthalmology, Community Medicine
6	Lafiya Clinic	Jun. 2007	1	Bare	13	Same as 1 above
<i>Total</i>			55			

Source: Fieldwork, January 2012

Table 5.4: *Primary and Secondary schools in the study area*

S/ No	Type	No	Level/Qualification/Subjects taught
1	Public Primary Schools	94	Primary level education-Mathematics, English, Arts and Crafts, Writing, Science etc
2	Private Nursery and Primary Schools	17	Ditto above
3	Universal Basic Junior Secondary School	15	Junior Secondary education-Mathematics, English Language, Integrated Science, Social Studies, Business studies, Agric. Sci etc
4	Senior Secondary Schools	7	Senior Secondary education/O'Levels: Maths, English Language, Biology, Chemistry, Physics, History, English Literature, Technical Drawing, Further Mathematics, Agric. Sci etc
5	Community Secondary Schools	8	Ditto above
6	Private Secondary Schools	8	Ditto above
		<i>Total</i>	<i>149</i>

Source: Billiri Local Government Education Dept., January 2012

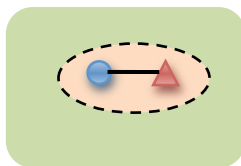
This has aided a sense of dissatisfaction among youth trying to earn a better life in urban areas. Disillusioned, they are loath to return to the ways of their fathers on the farm but are not adequately equipped to earn a living in a more skilled environment in part due to falling standards of education in public schools. An elderly informant observed,

"Many young people in the community, faced with high unemployment prospects and the harsh economic situation simply fall prey to social problems such as drinking, smoking, delinquency, insecurity and life in slums and unhealthy environments".

5.6.4 Changes in kinship relations and marriage

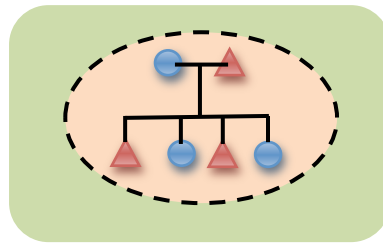
The most evident changes in the built environment arise from changes in kinship, marriage and family structure. The combination of Christianity and western education encouraged a monogamous way of life. Compounds increasingly accommodate single families in contrast to the communal lifestyle of traditional times (Figures 5.21-24). This correlates with some of Saad's findings on p. 7.

Figure 5.21:
*Modern day
households, 1st
stage: Family is
formed*



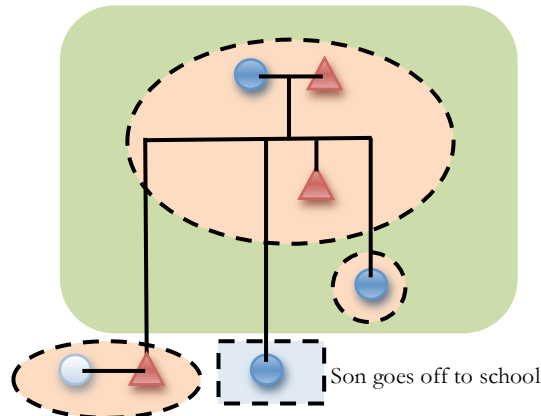
The marriage between a man and a woman starts a family and establishes a new compound.

Figure 5.22: **2nd stage:** Family grows



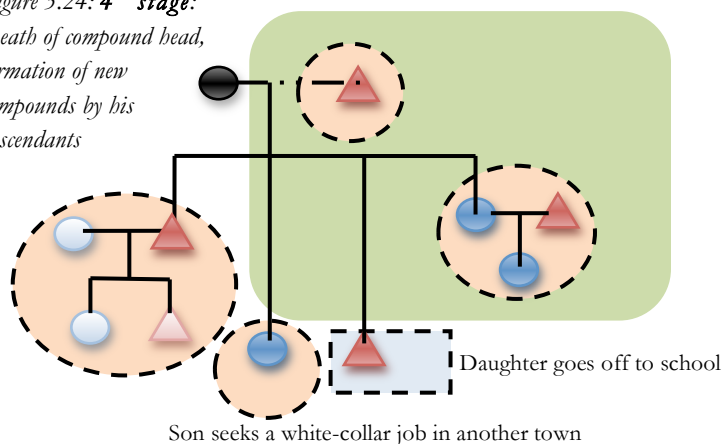
The family grows by way of addition of children. More dwellings and rooms are put up to accommodate them

Figure 5.23: **3rd stage:** Family extends



The older girl marries and forms a new compound of her own, one son goes to boarding school while the other stays at home to help on the farm. He establishes his hut outside his father's compound, but within the family lands.

Figure 5.24: **4th stage:** Death of compound head, formation of new compounds by his descendants



The death of the head of the compound signals another generation, but the initial family only breaks off when the wife dies, or remarries. The other son moves from school to another town in search of greener pastures but contributes to the welfare of his aged mother and younger sister who is now in school and returns home during the holidays.

With the weakening of extended family surveillance practiced in traditional times, urban compounds have increasingly come to depend on high walls constructed of hollow concrete blocks for security as seen in the latest trend of free standing bungalows in the community. This is not an isolated finding as "it thus seems that the freestanding house is becoming a new norm all over the world" Rapoport (2007:65). The manifestation and attributes of this trend in the

Tangale community is evident in four types of housing typologies, which reflect the changing nature of the Tangale culture under foreign and external influences⁸⁴. These range from mud thatched huts to aluminum and zinc clad free standing bungalows. Mud huts with thatched conical roofs are mostly found in the villages or traditional settings and accommodate a couple just establishing a family or whose children have left home. They are modelled after compounds built on the Tangale hills, within clan lands surrounded by family members. These are dwindling in number owing to difficulties in obtaining grass for thatching in part due to the urbanization process in the community (Plates 5.83-84).



Plate 5.83: **Mud thatched huts.** Source: Fieldwork, December 2011



Plate 5.84: **Mud thatched huts in another compound.** Source: Fieldwork, December 2011

The advent of Colonialists and missionaries brought about the introduction of a new typology into the erstwhile reclusive hill community via rectilinear buildings. Such compounds typically combine mud huts and rectilinear rooms. The introduction of trading by visiting Hausa traders in time fostered importation of new building materials such as zinc. This set the stage for a gradual transformation of circular mud huts in 1948 when the community relocated northwards to the surrounding plains (Plate 5.85-86).

⁸⁴ The documentation and analysis of these typologies is the focus of the next chapter, Housing in Tangale land.



Plate 5.85: A combination of mud huts and rectangular rooms Source: Fieldwork, December 2011



Plate 5.86: A rectangular room roofed with thatch. Source: Fieldwork, December 2011

Cement, imported after independence and subsequently manufactured in Nigerian factories made the shift to concrete blocks easier. Thus compounds comprising rectilinear concrete rooms clad with zinc emerged constructed entirely of this material, roofed with zinc sheets laid over wooden trusses (*Plates 5.87-88*).



Plate 5.87: A street in Billiri lined with concrete houses. Fieldwork, December 2010



Plate 5.88: A newly constructed concrete compound in Billiri. Fieldwork, December 2010

With the return of public civil servants trained by colonials and missionaries upon retirement, western style freestanding concrete bungalows strategically placed within walled compounds in occupied clan lands were imported into the community, reminiscent of gated communities in urban towns and cities of Nigeria (*Plates 5.89-90*). The open courtyard is however still employed for many household activities such as cooking, washing up, receiving guests etc.



Plate 5.88: Interior courtyard of a compound in Billiri showing latest trends. *Fieldwork, January 2012*



Plate 5.90: Another house displaying current trends in the community. *Fieldwork, January 2012*

From the foregoing discussion, the following can be surmised about the relationship between the four cultural themes and events in the history of the community and changes in the built environment via changing housing typologies. Initial settlements on the Tangale hills were based strictly on a male dominated patrilineal kinship structure. This underscored the *fusion* of small traditional compounds clustered around central spaces inhabited by family units within a clan. External influences of colonialism, Islam and Christianity created *fission* in this set up. Colonialism disintegrated the socio-political system of clan administration; Islam fostered trading and Christianity introduced western education and healthcare alongside rectilinear buildings. The relocation of the community in 1948 offered fertile ground for experimentation and *fusion* of traditional methods and customs of the new world, producing rectilinear rooms alongside round huts within walled courtyards. Independence/Federalism from 1960 fostered urbanization and education in the community, improving the economic lifestyle of many families. This is evident in *fission* of the mutual dependence on male dominated clan/family units, which encouraged the adoption of self-contained bungalows located within clan lands for security but often at a distance from the extended family. This argument supports the first hypothesis postulated by the study, which suggests that although architecture can be viewed as a container of culture, changes within that culture modulated by other

influences over time also find reflection in the built environment. In Tangale land, these are typically compounds and housing units community residents produce, within which daily affairs are carried out.

Pursuing this argument further however raises a counter argument. Irrespective of these changes, certain features of the built environment seem to have resisted the influence of external forces. The adherence to locating compounds within clan lands and continued use of open courtyards for example, seem to suggest a second possibility, that architecture could serve as a mechanism of cultural resistance against what maybe perceived as invading forces of modernization (Frampton, 2002). The two arguments raise an important issue, the contrast and tension between passive and active agents in architecture as expressed in the domestic built environment of this community. In other words, to what extent is architecture seen as a passive and active agent of change in Tangale land? This issue is addressed in more detail in the next chapter.

The ethnographic narrative has been instrumental in establishing the basic lifestyle of the Tangale community, how these have changed over time and the possible relationships between such changes and observed social problems in response to the first, second and fourth research questions respectively posed in Chapter One⁸⁵. There is however a need to test and establish which factors, themes and concepts have been consistent throughout the course of the community's history in line with the third research question of the study. Additionally, which variables arising from the ethnography can be used to establish passive and active agents in the built environment? This is the focus of Chapter Six, Housing in Tangale land.

⁸⁵ Refer to p. 17

5. 7 The architect as an ethnographer, a personal reflection

At the beginning of the chapter, I explained my initial goal in carrying out an ethnographic study, which was to establish the relationship between architecture and culture. The underlying premise was that changes in the lifestyle of the community would be reflected in the built environment and in architecture. This was largely based on ontological knowledge gathered over time throughout the formal years of training as an architect. I was subconsciously attempting to test an assertion based on the notion there existed an architecture in the study area in the first place, a classical case of naïve realism. I took that as given. My informants, though obviously willing to help, did not necessarily share this point of view. This was my first source of frustration. Only by 'de-briefing' my mind to listen to what my informants had to say about their cultural values, lifestyle and norms was I able to make headway. By temporarily letting go of my focus on architecture and changes in the built environment, I was eventually able to see the native point of view for a clearer understanding of the culture. By listening to my informants, I was able to eventually link their descriptions and what I observed about the culture to what I had originally presumed-that there was a link between Tangale cultural values and the built environment they produced. In so doing, I had to rely on interdisciplinary methods employed by anthropologists, sociologists and behavioural scientists. I employed the use of informal interviews and questionnaires, photographs, note taking, drawings and sketching and participant observation for the discussions, which sometimes involved more than one informant in focus groups. These are techniques seldom covered by formal architectural training, especially in Nigeria. Without these however, establishing the basics of Tangale ethnography and worldview would have at best, been perfunctory.

As is, the process was not without its problems. The practicality of conducting 50 interviews, my target for this initial survey within a period of eight

weeks at the end of the year, during harvest time was hectic. The problems of insurgency in North East Nigeria was also escalating at the end of 2010 when I conducted these interviews, heightening the sensitivity for security in most communities of the region. Infact, the second measured survey, reported in Chapters Six and Seven was conducted partly during the period of a national labour strike early in January, 2012. I concluded the survey a few days prior to international airports becoming operational, just in time for me to travel back to Nottingham to continue my studies on schedule. Unfortunately, this was the best time to meet people at home. Additionally, I needed to first secure permission for most of the interviews. This usually necessitated a minimum of two visits. The positive outcome was that informants frequently chose a time when they were resting at *tal mana* with other friends, so focus group discussions ensured. This greatly added value to the stories, experiences and narratives I gathered. Ethical considerations prevented my taking videos or photographs of people that could directly link any source of information to participants⁸⁶. Furthermore, poor electricity supply in the community meant I had to sometimes employ two mobile cell phones along side rapid note taking to record discussions as larger tape recorders easily ran out of charge. They also made informants self-conscious and uncomfortable. Mobile phones, widely used in the community, could be recharged at roadside shops using portable generators for a small fee. This has become a veritable source of income for a couple of residents. It also meant that I had to transcribe fieldnotes and observations onto my laptop when electricity supply was restored. This was frequently late at night.

The main weakness of the ethnographic approach lies in its broad scope and subjective nature. Consequently, discussions presented in this chapter are based on the ethnographer's understanding and translation of the culture. Although supported by explanations and quotes from informants, the

⁸⁶ See *Appendix 2*, information sheet and consent forms for participants

interpretation and translation of cultural ideas and theories depend on the ethnographer. For a robust discourse in a scientifically oriented discipline such as architecture, subjective ideas, though valid frequently need to be further tested using more objective methods. Furthermore, the lack of precise dates or time frames for the settlement history of the seven clans on the Tangale hills in section 5.2 arose largely due to the oral nature of the culture. Precision of dates often get lost or muddled over time when stories and narratives are handed down orally from one generation to another. An archeological study of the hills employing techniques such as carbon dating for instance, will be beneficial in this regard. Unfortunately, this is far beyond the scope of this research.

These weaknesses and problems notwithstanding, interdisciplinary techniques employed in this survey, notably open ended questions, discussions and participant observation suited the generation of cultural themes and initial ideas which were instrumental in providing a broad overarching world view of the Tangale culture. They were also beneficial in raising pertinent questions relating to architecture and theory, the possibility of architecture serving as a container of culture as well as a mechanism of cultural resistance (Rapoport 1969, Frampton 2002). Architects, by virtue of their training are best positioned to bridge this gap and maximize the opportunity presented by such approaches in adequately linking ideas and theories generated from anthropological and sociological fieldwork to architectural practice. Generally, anthropologists study a wide range of practices and artifacts but often take for granted the actual buildings in which these activities occur (Ethnofoor, 2011). Buildings are primary constituents of social bonds and serve as important media for symbolic, ritualistic, artistic and political expression and in this sense, architecture and cultural anthropology are closely related. Despite these close ties, "an anthropology of architecture that focuses on the entanglement of architectural, social and symbolic processes does not seem to have emerged" (Vellinga 2007:757). Relatively few studies have

attempted to relate internal principles, the hidden and abstract systems of culture with those of built form (Lwamayanga, 2008). This can be properly achieved with the right training and proper orientation of interdisciplinary approaches in architectural schools. Consequently, testing the ideas generated by the ethnographical survey, which are linked to the two hypotheses posed by the study using more objective techniques, is the focus of the next chapter, Chapter Six, Housing in Tangale land.

Conclusion

This chapter presented findings from an ethnographic survey based on a qualitative approach, which established four thematic events that influenced Tangale culture from 13th Century to present day. Importantly, it surmises that the study of architecture and building artifacts can greatly benefit from interdisciplinary approaches as it forms the basis of establishing cultural values and worldview of the community as well as proffering explanations regarding the relationship between changes in culture and those observed in the built environment. The survey was also instrumental in generating ideas about the possibility of architecture acting as a passive and active agent of change. These ideas and theories are tested in the next chapter on a sample of selected compounds via physical descriptions and space syntax analysis.

CHAPTER SIX: HOUSING IN TANGALE LAND

Summary

Chapter Six presents the effects of changes in lifestyle expressed in the built environment of Tangale land. Findings explore how major events described in Chapter Five influenced housing typologies and transfer of technology, supporting the first hypothesis of the study and the passive role architecture plays. Space syntax analyses confirm the predominant use of open courtyards as the most integrated spaces that correlate with space use within households as well as compound transformation patterns. This supports the second hypothesis posed by the study. The chapter concludes with suggestions of socio-cultural factors influencing house form and residential structure in the community.

6.1 Architecture as a passive and active agent of change, an introduction

The preceeding chapter presented an ethnographic account of the Tangale people and changes within it's culture. These are reflected in built forms, "which maybe considered as a physical mechanism which reflects and helps create the world view . . . of a people" (Rapoport 1969:48). In other words, architecture as expressed in built forms serves as a container and reflector of the dynamic nature of the community's culture, taking on a passive role as suggested by the first hypothesis of the study. To test the validity of this claim, architectural characteristics of 45 randomly selected compounds in the study area were analysed based on theoretical concepts of lifestyle, space use, house form and spatial configuration developed in Chapter Four, Research Methodology. The analysis is structured along the four historic events in the community and resulting typologies identified in Chapter Five. This is presented in section 6.2.

Closely related to this is the assertion that architecture can also serve as a mechanism of cultural resistance in an active role. Frampton argues that such architecture "has the capacity to cultivate a resistant, identity-giving culture while at the same time having discreet recourse to universal technique" (Frampton 2002:20). "Certain aspects of behavior and way of life are constant or change

very slowly” (Rapoport 1969:78). This is frequently a way to preserve salient aspects of culture, which is expressed in the built environment. The continued use of the open courtyard as the main living space and female domain, forecourts as male dominated areas as well as location of compounds within occupied clan lands observed throughout the course of housing transformations in the Tangale community suggests this maybe the case, as expressed in the second hypothesis of the study. Space syntax analysis of the floor plans of compounds based on space use was employed to test this hypothesis in sections 6.3-4.

During the course of the ethnographic survey described in the preceding chapter, certain factors such as kinship, basic needs, security, social network and gender roles began to emerge as strong socio-cultural influences on house form and urban planning (Maina, 2012a). Eight variables from interdisciplinary concepts developed in the theoretical framework relating to the ethnography of the community were then identified and integrated with a questionnaire employed by Muhammad Oumar (1997) for his study of Hausa domestic architecture in Kano, Nigeria⁸⁷. These include location and access to compounds, boundaries, spatial organization, plan shape, type and use of space as well as style and appearance of spaces. Location and access to compounds arise from user lifestyle. Land is the most valued resource in this community. In the built environment, this is expressed via location and access to compounds traditionally constructed on inherited land. Boundaries and type of space relate to the physical extents of spaces and category of spaces, whether rooms, courtyards, forecourts etc. These are concepts from sociology and behavioural approaches. Plan shape, style and appearance relate to house form and structure while organisation of space arises from the concept of spatial configurations. Results from the measured survey, space syntax analysis and interview responses from heads of the 45 measured compounds and their spouses were subsequently employed to

⁸⁷ Muhammad Oumar (1997:276-286).

establish socio-cultural factors influencing house form and residential structure in the Tangale community. These are discussed in sections 6.5-6. “The emphasis on socio-cultural factors derives from the recognition by designers that the success of systems relies on the social contexts in which they are placed and used” (Crabtree and Hemmings 2001:4). The chapter concludes with a brief conclusion and implications of findings regarding housing in the study area.

6.2 Housing transformation and typologies

A house in this community is basically a compound comprising individual housing units and other supporting structures within the confines of an open but walled courtyard. This residential structure is common for many traditional Nigerian communities. In the measured survey to document the current housing situation as well as to ascertain relationships between cultural changes and the built environment, compounds were classified according to the year they were established, building materials, construction, space use and spatial organization. These roughly correspond to the main historical events discussed in Chapter Five (Table 6.1). The characteristics of these compounds are discussed below.

Table 6.1: Relationship between main historical events and housing typologies

<i>Event</i>	Migration from Yemen, 13-14 th Century	Colonialism, Islam and Missionaries	Relocation to lower plains (1948)	Independence (from 1960) to date
<i>Typology</i>	1 st	2 nd	3 rd	4 th
<i>Description</i>	Mud huts in tight patrilineal family clusters	Mud huts and rectangular rooms according to family lands	Concrete houses and rooms in clan lands	Free standing concrete bungalows in clan lands
<i>No of compounds</i>	1 (Cpd.1)	33 (Cpds. 2-34)	6 (Cpds. 35-40)	5 (Cpds. 41-45)
<i>%</i>	2.2	73.3	13.3	11.2

6.2.1 Circular huts with thatched conical roofs

Compound 1 constitutes the only example of this typology in the sample. The compound head (CH), a night watchman and farmer received my field assistant and I in the central space, which serves as a forecourt to several compounds about 10 meters apart inhabited by the CH's sons and uncle. The simple compound is constructed entirely of mud and clad the traditional way with thatched conical roofs. Access to the compound from the forecourt is through the courtyard. Two sleeping huts, a bath, an animal shelter and cooking hut complete the ensemble. It is constructed on patrilineally inherited farmland with fresh growing vegetables and maize still evident all around to the back and sides of the compound walls (Figure 6.1). Most household activities such as cooking and food preparation were carried out within the courtyard. This typology reflects the traditional cultural values of kinship, social network, security, basic needs and gender roles as practiced on the hills prior to any external influence. The CH however explained that such structures were gradually becoming extinct.

"Modern technology has encouraged the construction of concrete block houses which are easier to maintain, although expensive to put up. Importantly, urban growth around Billiri has encroached on surrounding farmland and bushy areas where we used to obtain grass for thatching".

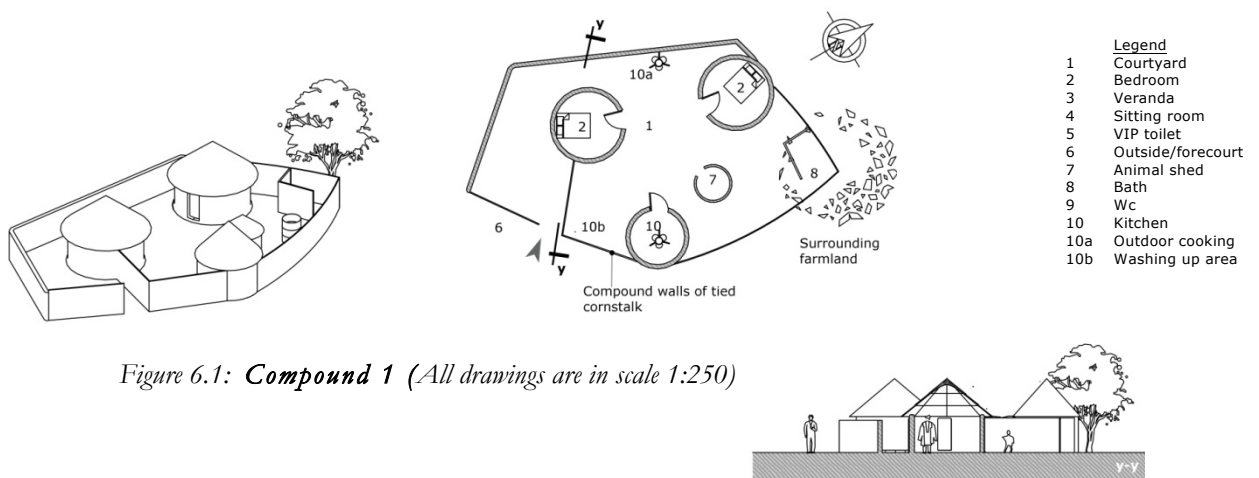


Figure 6.1: **Compound 1** (All drawings are in scale 1:250)

6.2.2 Combination of rectilinear rooms and mud huts clad with corrugated iron sheets and thatch

Rectilinear rooms and mud huts comprise the vast majority of surveyed compounds, accounting for 73.3% of the sample (*Table 6.1*). 10 of such compounds are constructed entirely of mud. The remaining 23 are constructed with both mud and concrete hollow blocks, the latter locally referred to as sandcrete blocks. This is a walling unit produced from cement, sharp sand and water in a rough ratio of 1:9 parts cement and sand using a standard headpan (Raheem, Momoh and Soyingbe, 2012). The blocks are moulded and cured for about three to four weeks. There are basically two types. The larger type is used to construct mainly external load bearing walls and measure 225 x 225 x 450mm. These are commonly known as 9-inch blocks. The smaller type is used for constructing non-load bearing walls and internal partitions, measuring 150 x 225 x 450mm. These are referred to as 6-inch blocks (*Plates 6.1-2*).



Plate 6.1: 150mm wide concrete blocks being cured. Presently, these are the blocks used for concrete structures in the community (see Chapter 6). Source: Fieldwork January 2012

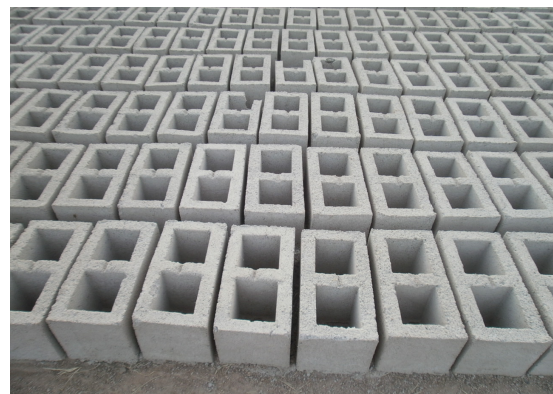


Plate 6.2: 225mm wide concrete blocks. The larger sizes are mainly used to construct load bearing or external walls laid in stretcher bonds. Source: Fieldwork January 2012

Of the 33 compounds in the 2nd typology, 27 are built on inherited or ancestral lands in urban or urbanizing village settlements. The remaining 5 CHs bought their plots and constructed the housing units themselves (*Appendix 14*). Consequently, many compounds had the entire plot walled as

part of the courtyard with a setback from streets and public footpaths before the building line. This serves as the forecourt or *tal mana*. This space is frequently used by CHs and male members of the family to receive guests and for leisure as practiced in traditional times. Some of the compounds had a concrete seat constructed against the external wall or shady tress expressly for this purpose (Figures 6.2, 6.4-6, 6.8 and 6.10). I met the CHs of several compounds in this space, one of whom remarked,

"Tangale men live outside, not together with their wives unlike westerners who who stay indoors with their women. There is thus a need for a separate and distinct male domain, tal mana, po kwara or tibilto".

Access to most of these compounds is through a single entrance from the forecourt into the open courtyard for security reasons. Multiple entrances only featured in compounds frequently accommodating large extended or composite families such as Compounds 8, 17, 18, 19 and 22⁸⁸ (Appendix 9). Other spaces for sleeping and services are usually accessible from courtyards and associated verandas. These are organized around the perimeter of the courtyards, forming part of compound walls, such as obtains in typology 1.

Compounds in this typology two also differ from the example in the first typology in the introduction of additional function specific spaces such as stores, dining rooms and living rooms accommodated under a single structure or house. These are however used largely in multifunctional ways. For instance, sitting rooms in Compounds 2, 6, 9, 14, 18, 19, 23, 24, 25, 31 and 34 are utilized for eating meals as well as for performing other functions such as food preparation and play (Appendix 10). Some are converted into sleeping spaces especially at night. Bedrooms are frequently employed to store farm produce and maintenance tools, receive guests, eat meals as well as cater to personal needs (Compounds 4, 7, 12, 14, 15, 17, 24, 28,

⁸⁸ See corresponding figures for details. Compound 8 is illustrated in Figure 6.8, Compound 17 in Figure 6.17 etc

32, 33 and 34). Courtyards and verandas, the latter used as a covered extension of the courtyard are the most used functional spaces in this typology and indeed the entire sample (*Appendix 10*). Compound 17 had a shop attached to its compound walls, with customers served from outside the compound walls while forecourts of Compounds 2 and 22 are used to sell sugarcane and firewood respectively.

The form of housing units within compound walls are largely rectilinear with a few circular structures in older compounds, reflecting the influence and adoption of rectangular buildings constructed by missionaries and colonial masters prior to the relocation of the community from the Tangale hills. This event in 1946 offered residents the opportunity to implement and experiment with these new forms. Several compounds were established from 1948 into the 1950s (*Appendix 14*) many of which were finished with cement plaster. Open courtyards are frequently left unfinished, with the exception of Compounds 18 and 30. This was a source of dissatisfaction for several women as cement plastered courtyards were easier to clean and maintain (*Appendix 13*). The presence of incomplete new concrete buildings within many compounds suggests the gradual adoption of a foreign technology into the community, highlighting another aspect of the built environment conforming to changing trends within its culture.

Figure 6.2: *Compound 2*

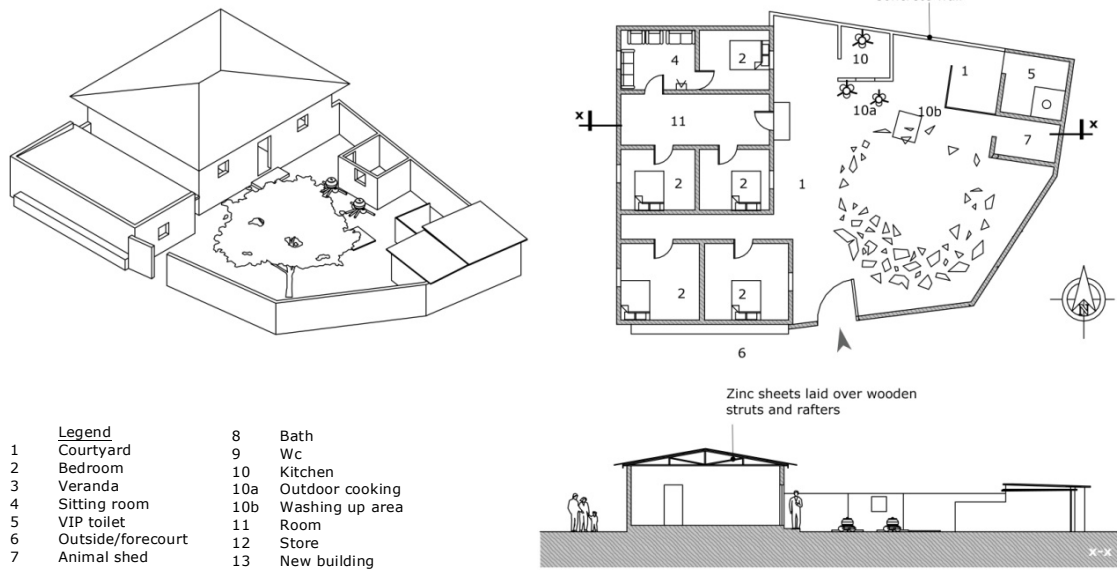


Figure 6.3: *Compound 3*

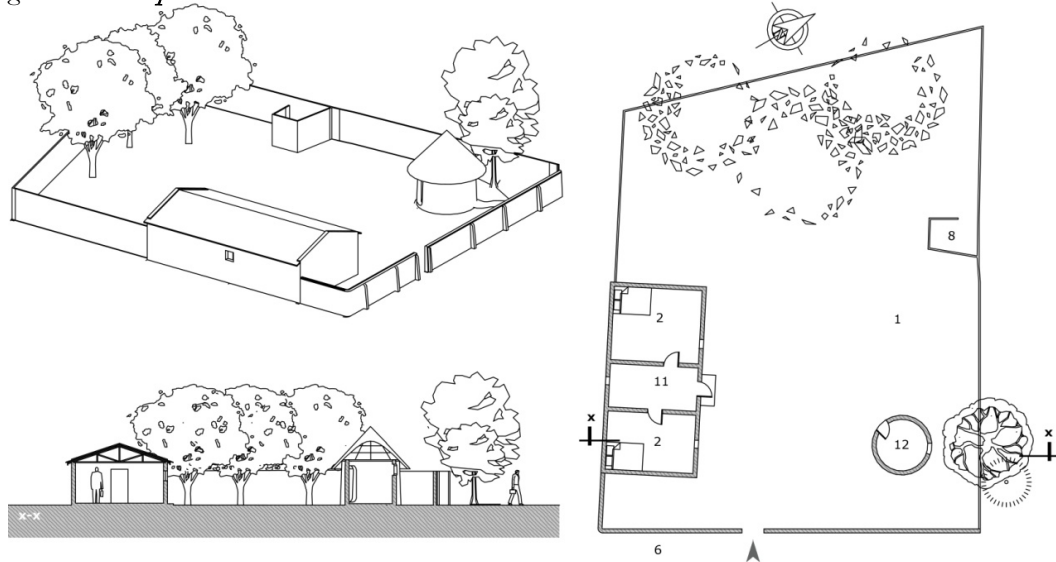


Figure 6.4: *Compound 4*

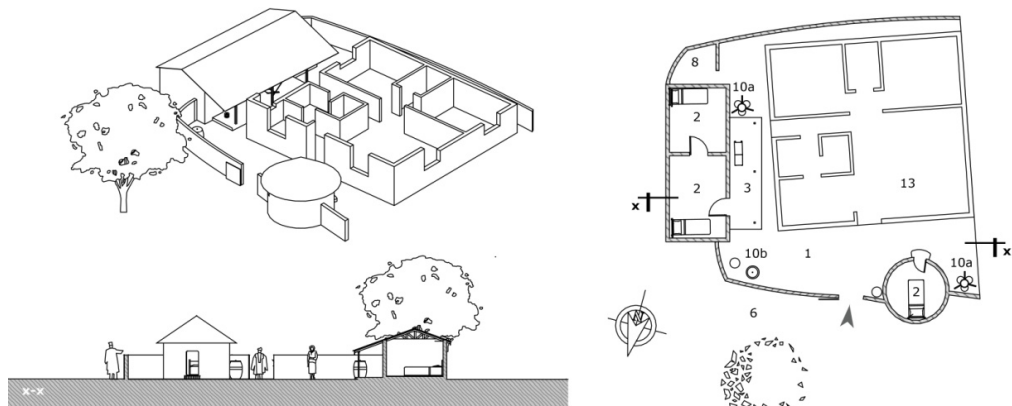


Figure 6.7: Compound 7

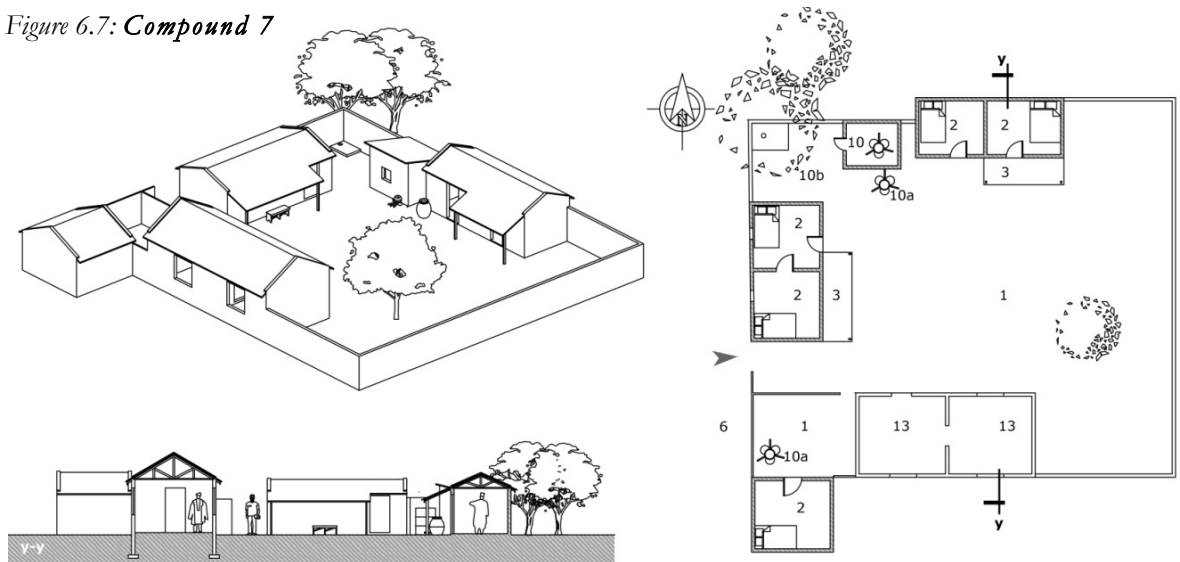


Figure 6.8: Compound 8

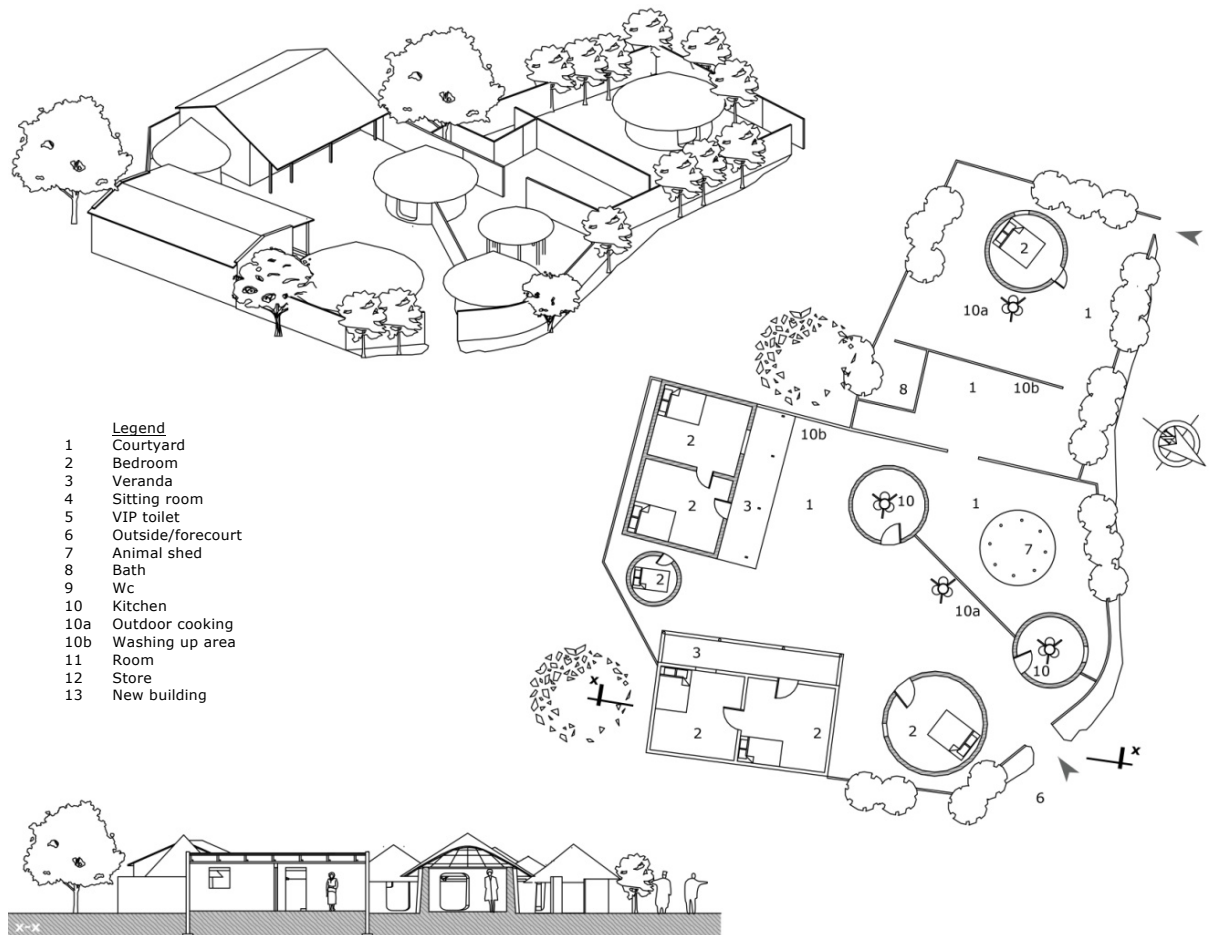


Figure 6.9: Compound 9

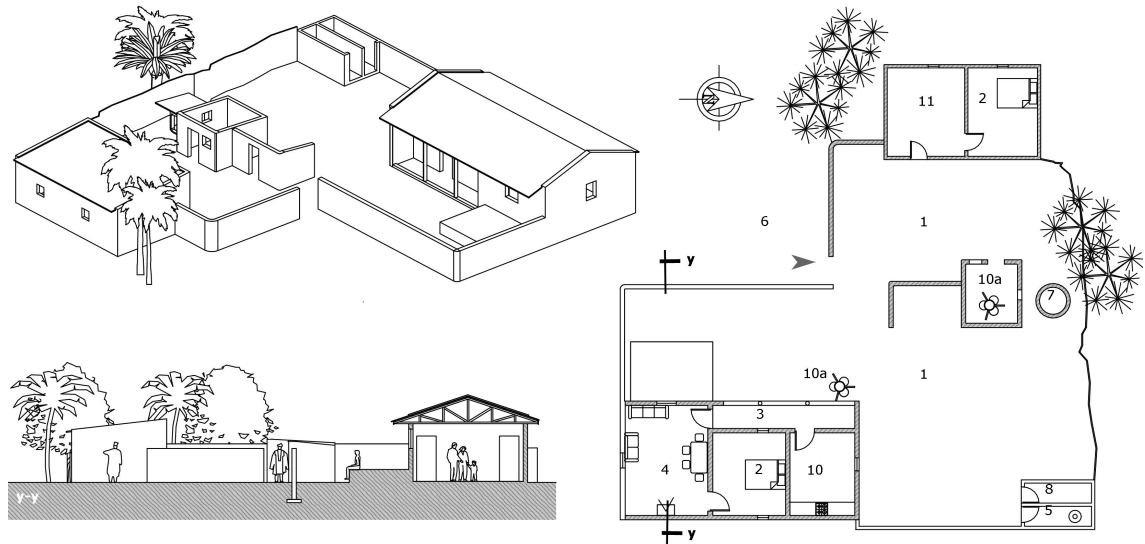


Figure 6.10: Compound 10

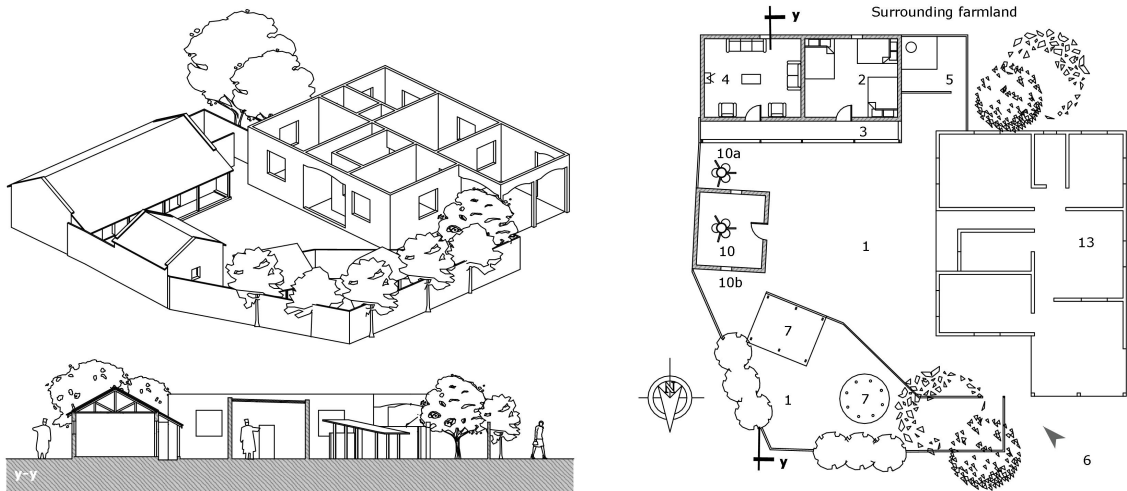
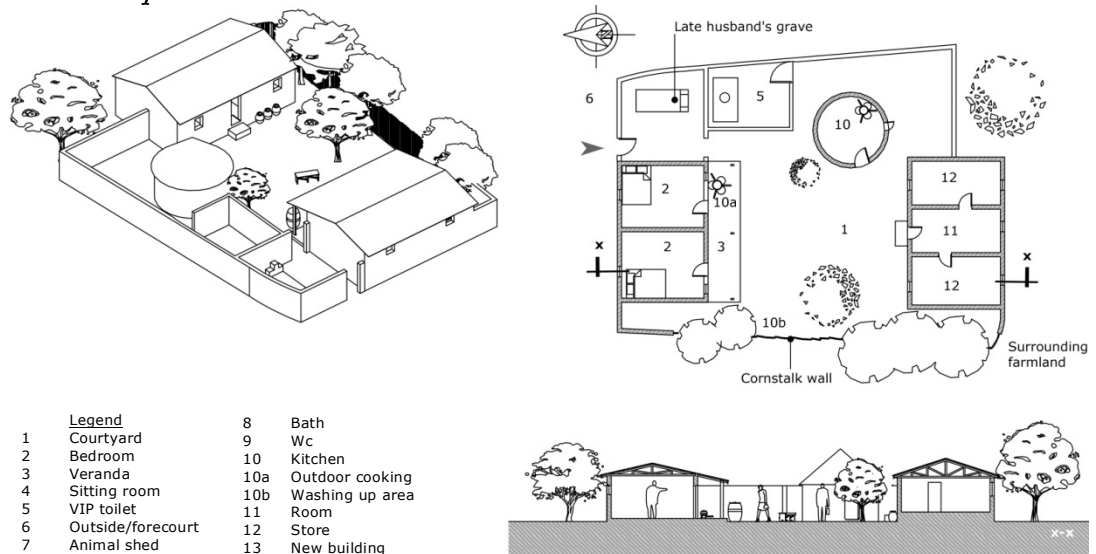


Figure 6.11: Compound 11



- | Legend | |
|--------|-------------------|
| 1 | Courtyard |
| 2 | Bedroom |
| 3 | Veranda |
| 4 | Sitting room |
| 5 | VIP toilet |
| 6 | Outside/forecourt |
| 7 | Animal shed |
| 8 | Bath |
| 9 | Wc |
| 10 | Kitchen |
| 10a | Outdoor cooking |
| 10b | Washing up area |
| 11 | Room |
| 12 | Store |
| 13 | New building |

Figure 6.12: Compound 12

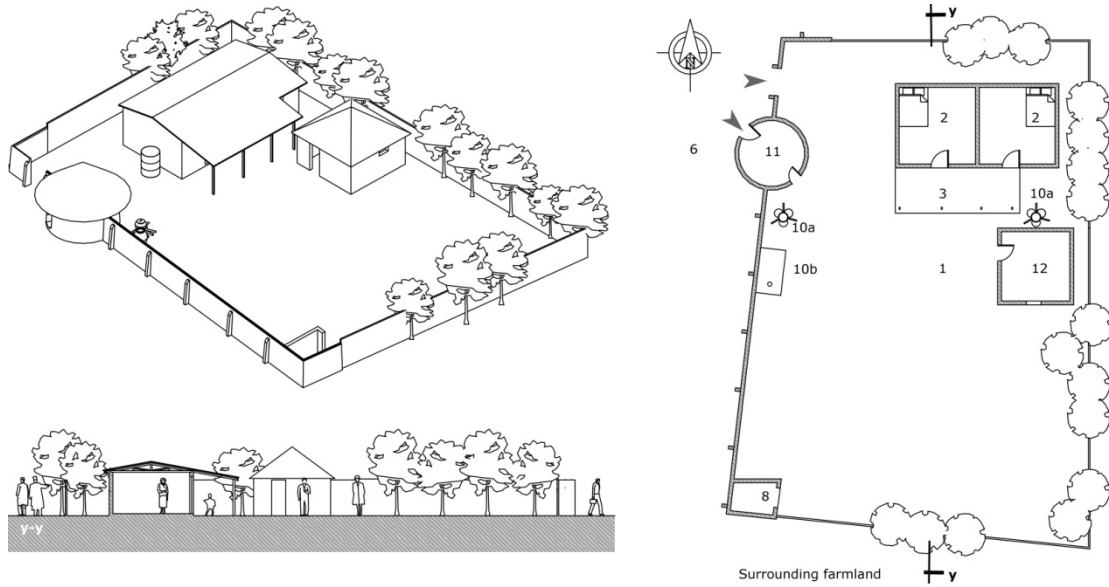


Figure 6.13: Compound 13

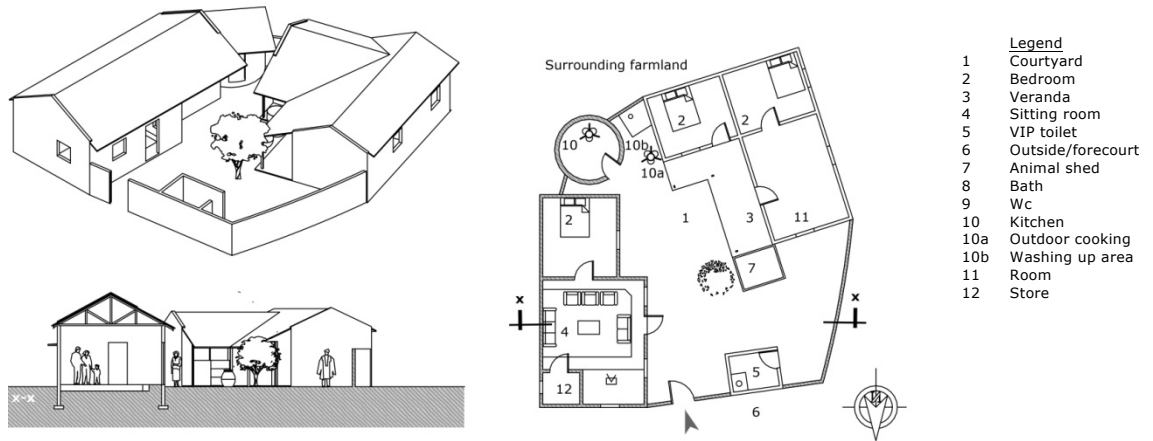


Figure 6.14: Compound 14

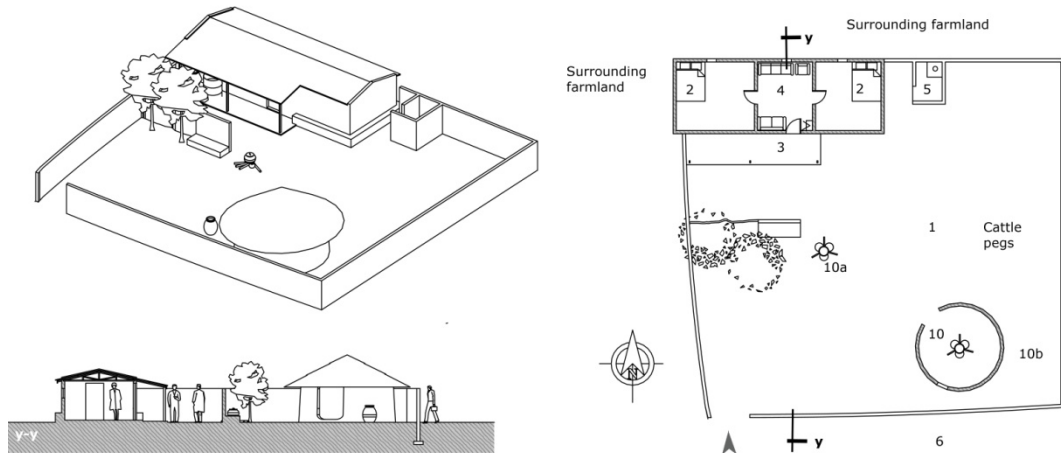


Figure 6.15: Compound 15

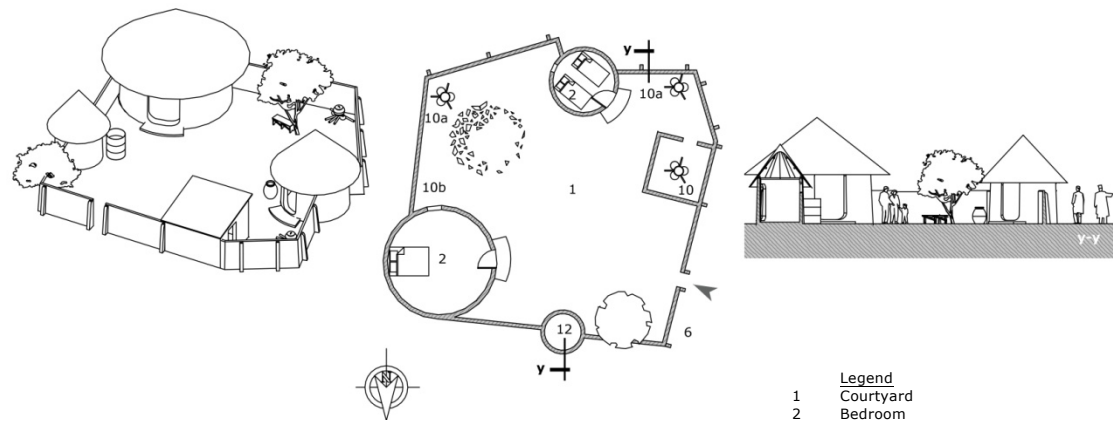


Figure 6.16: Compound 16

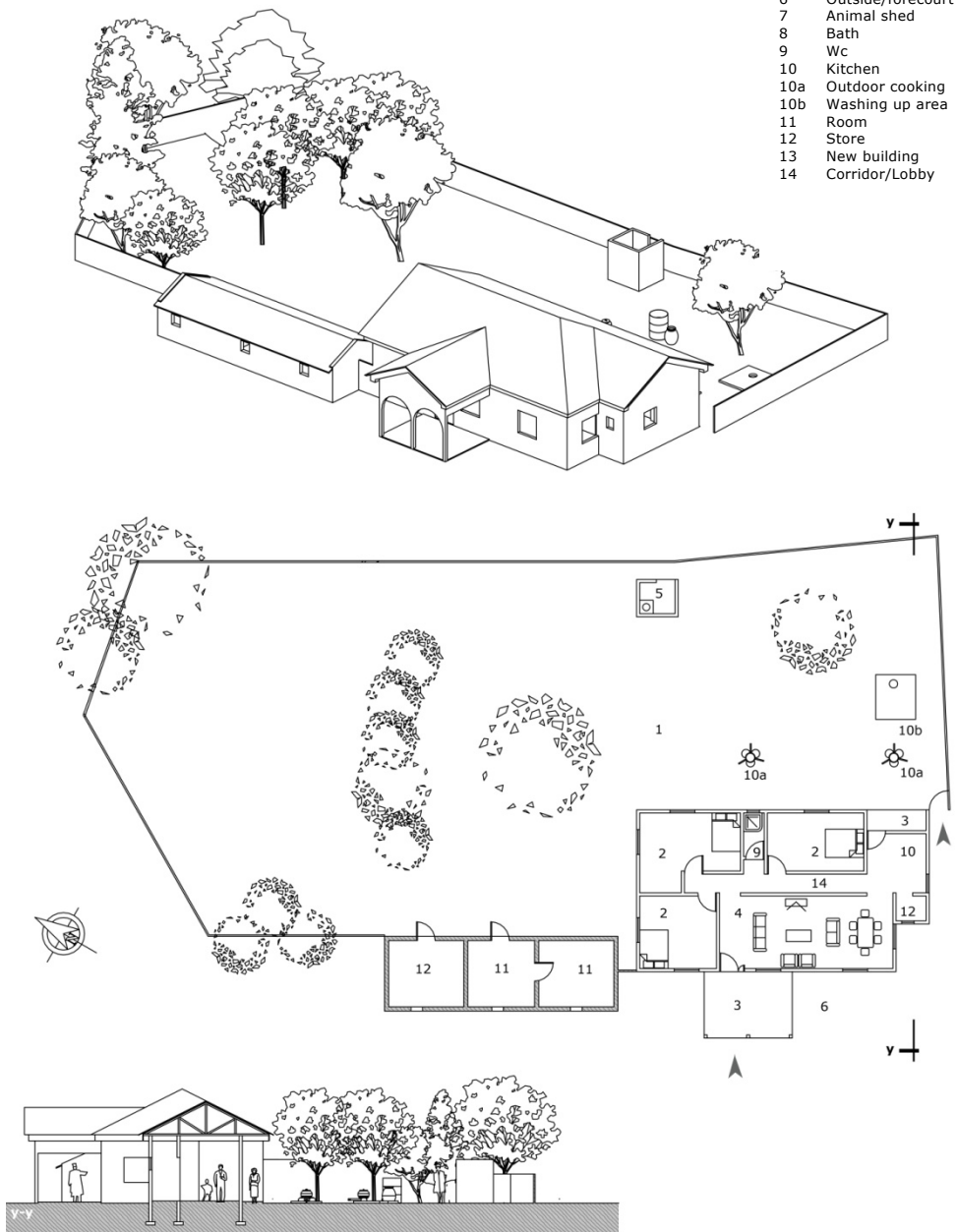


Figure 6.17: **Compound 17**

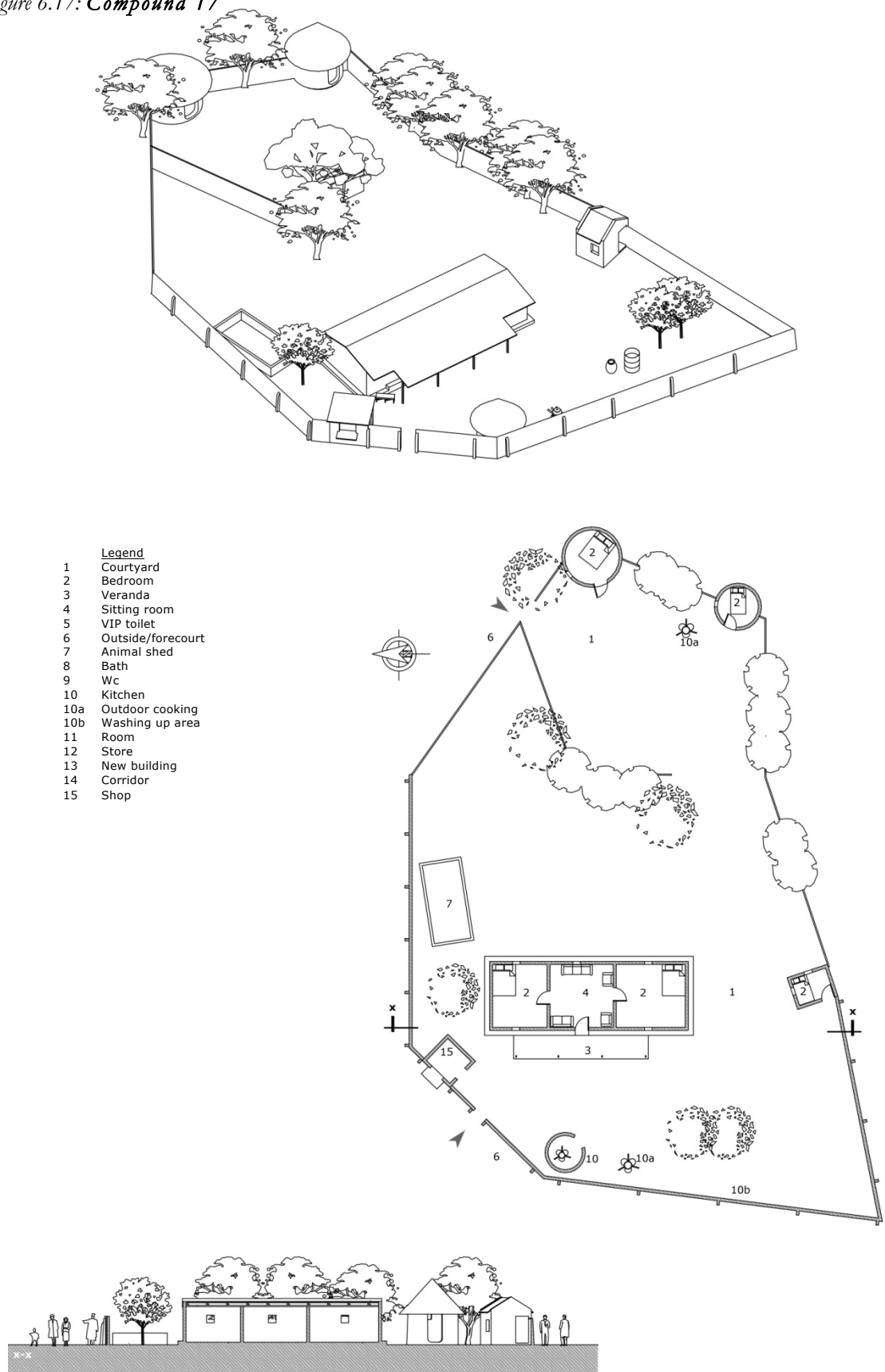


Figure 6.18: *Compound 18*

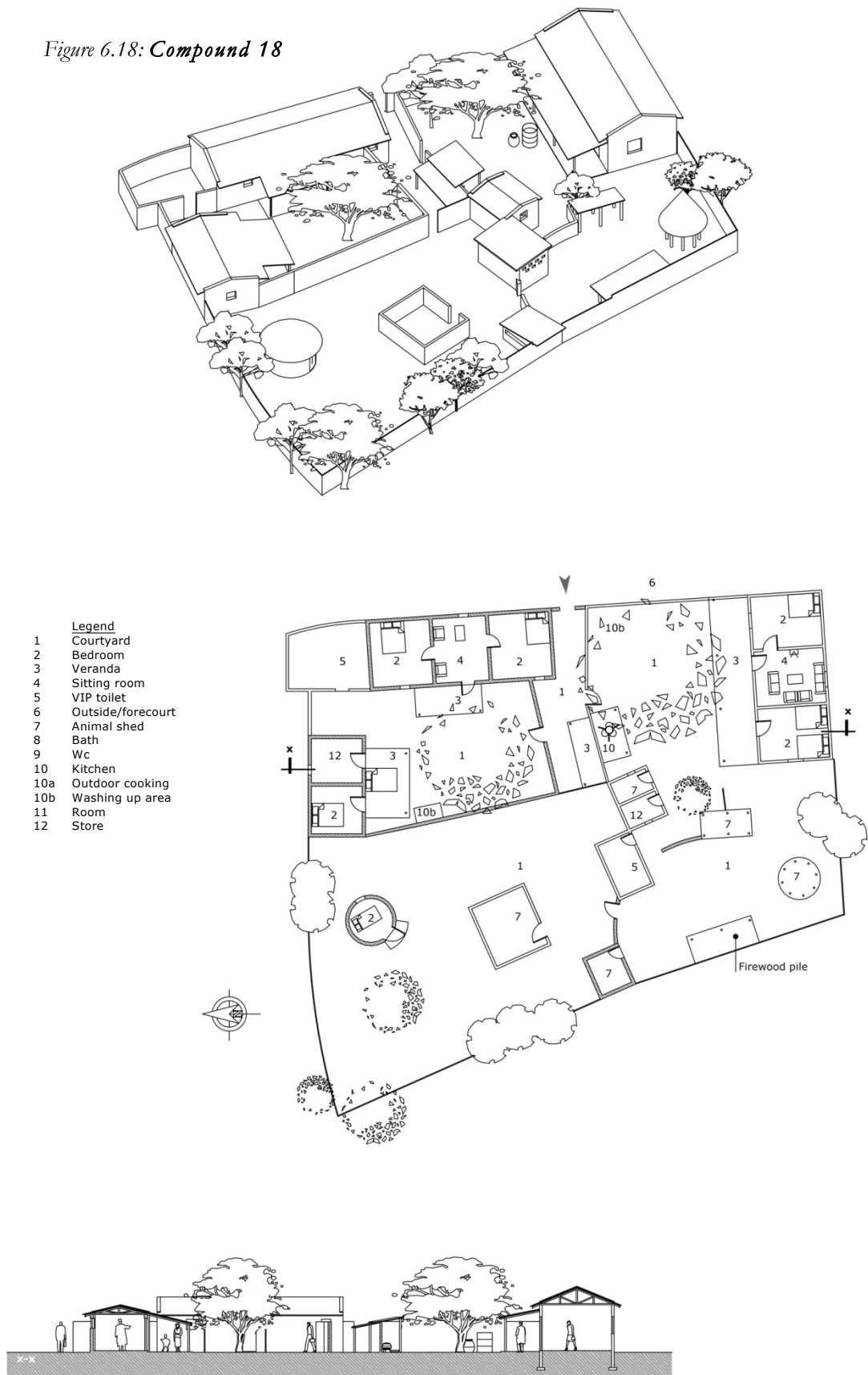


Figure 6.19: **Compound 19**

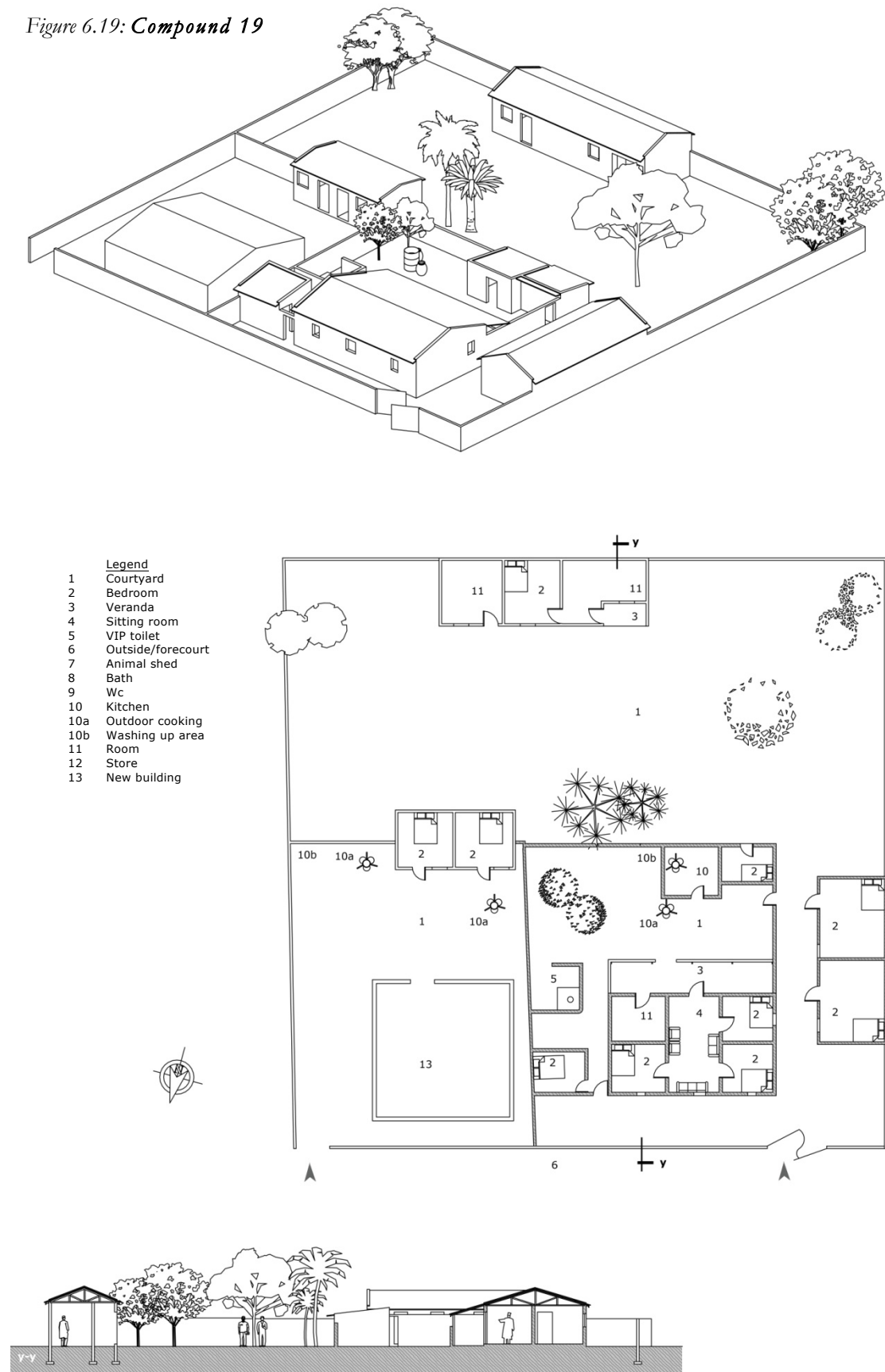


Figure 6.20: *Compound 20*

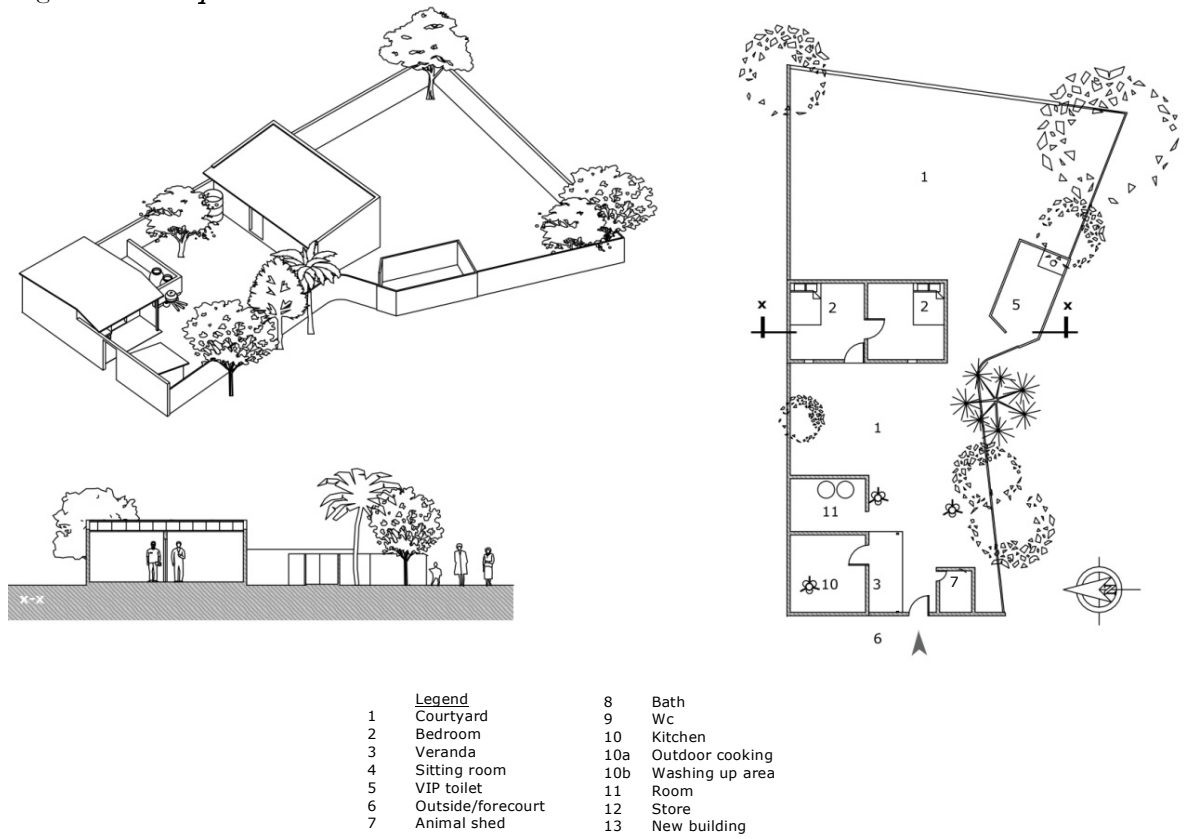


Figure 6.21: *Compound 21*

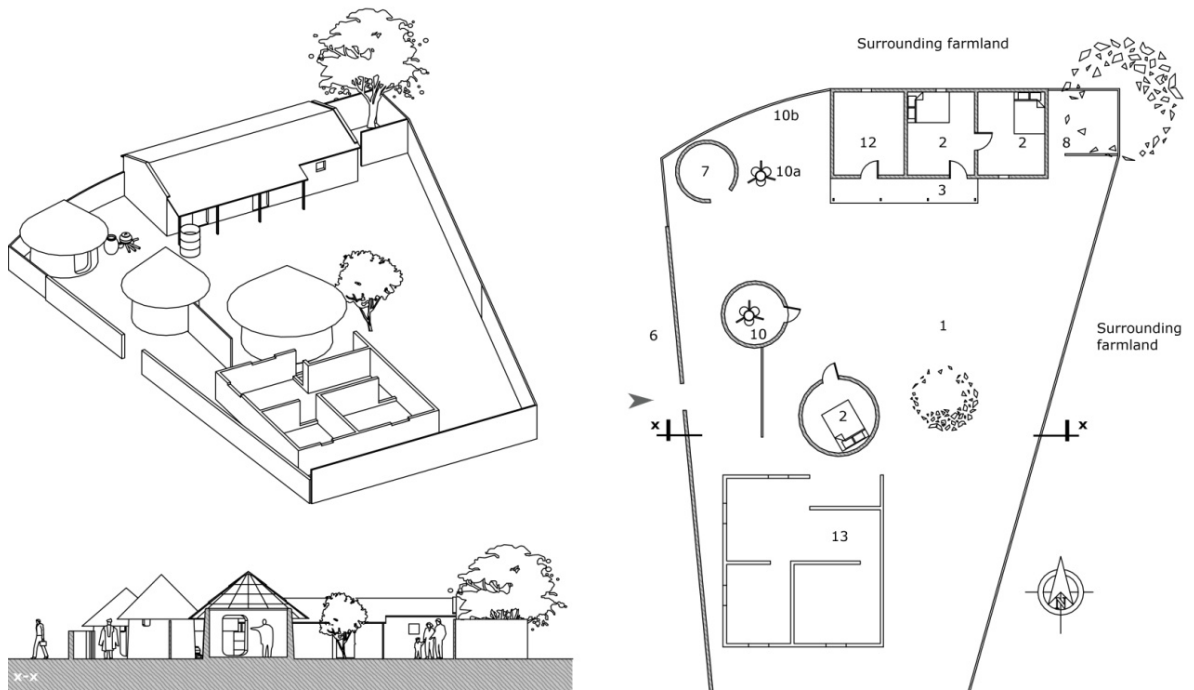


Figure 6.22: *Compound 22*

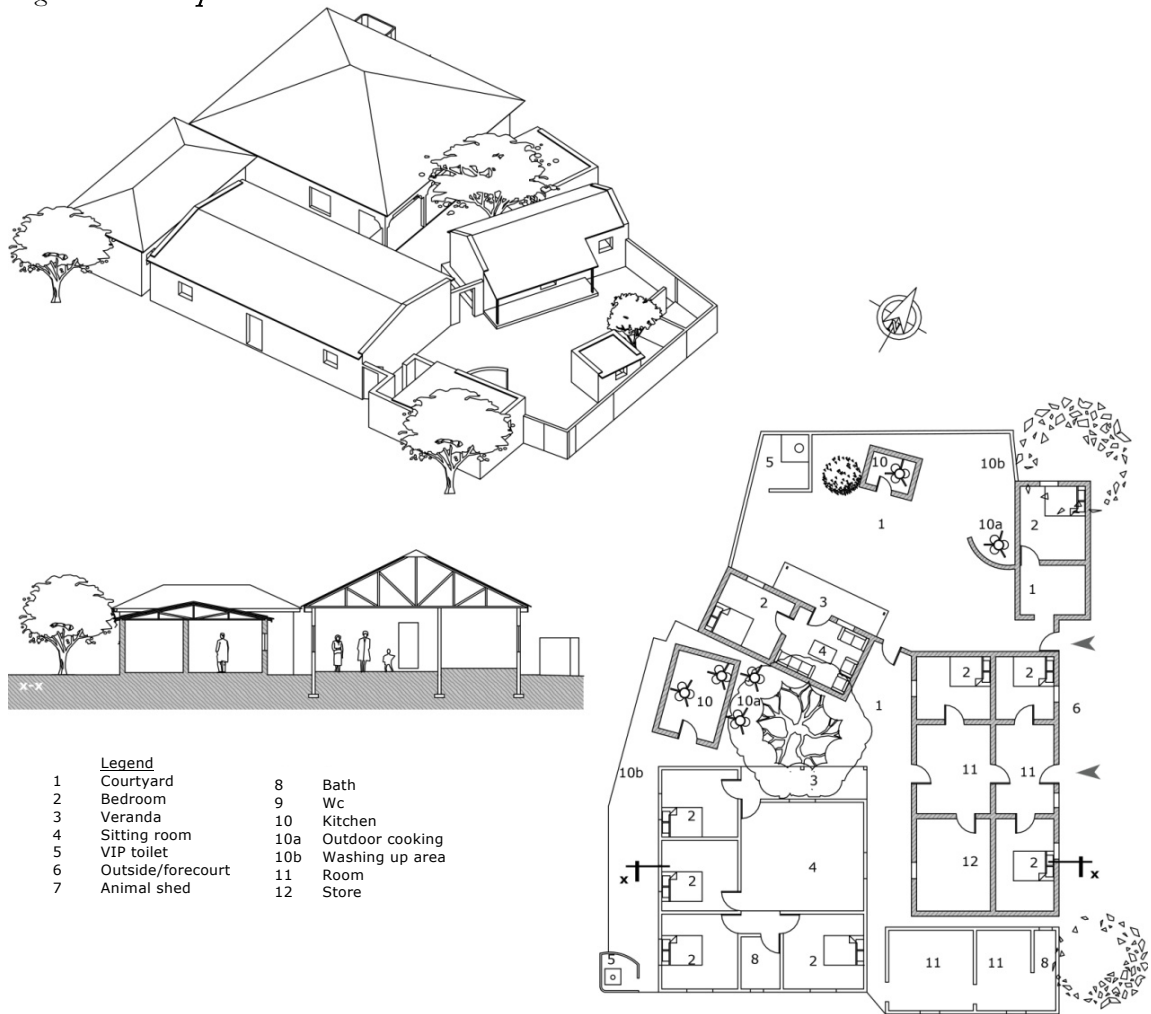


Figure 6.23: *Compound 23*

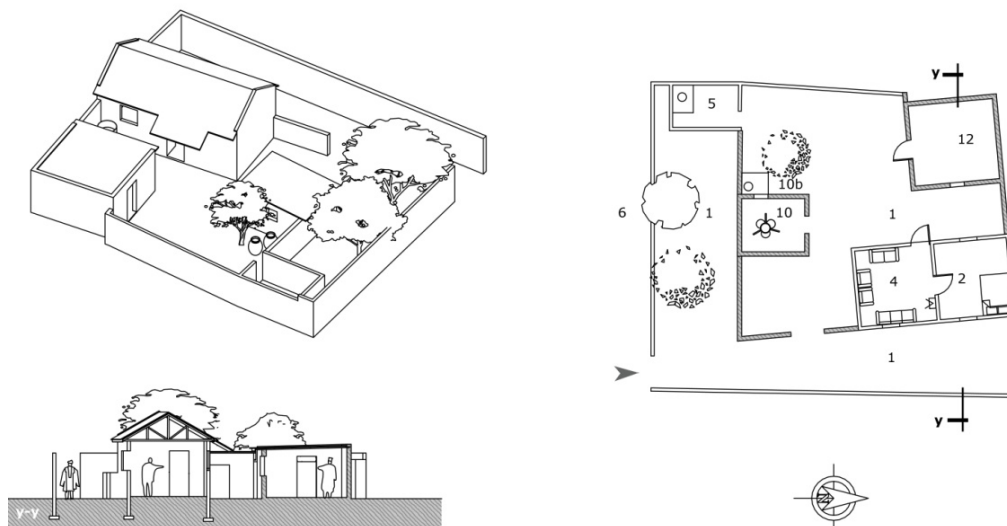


Figure 6.24: **Compound 24**

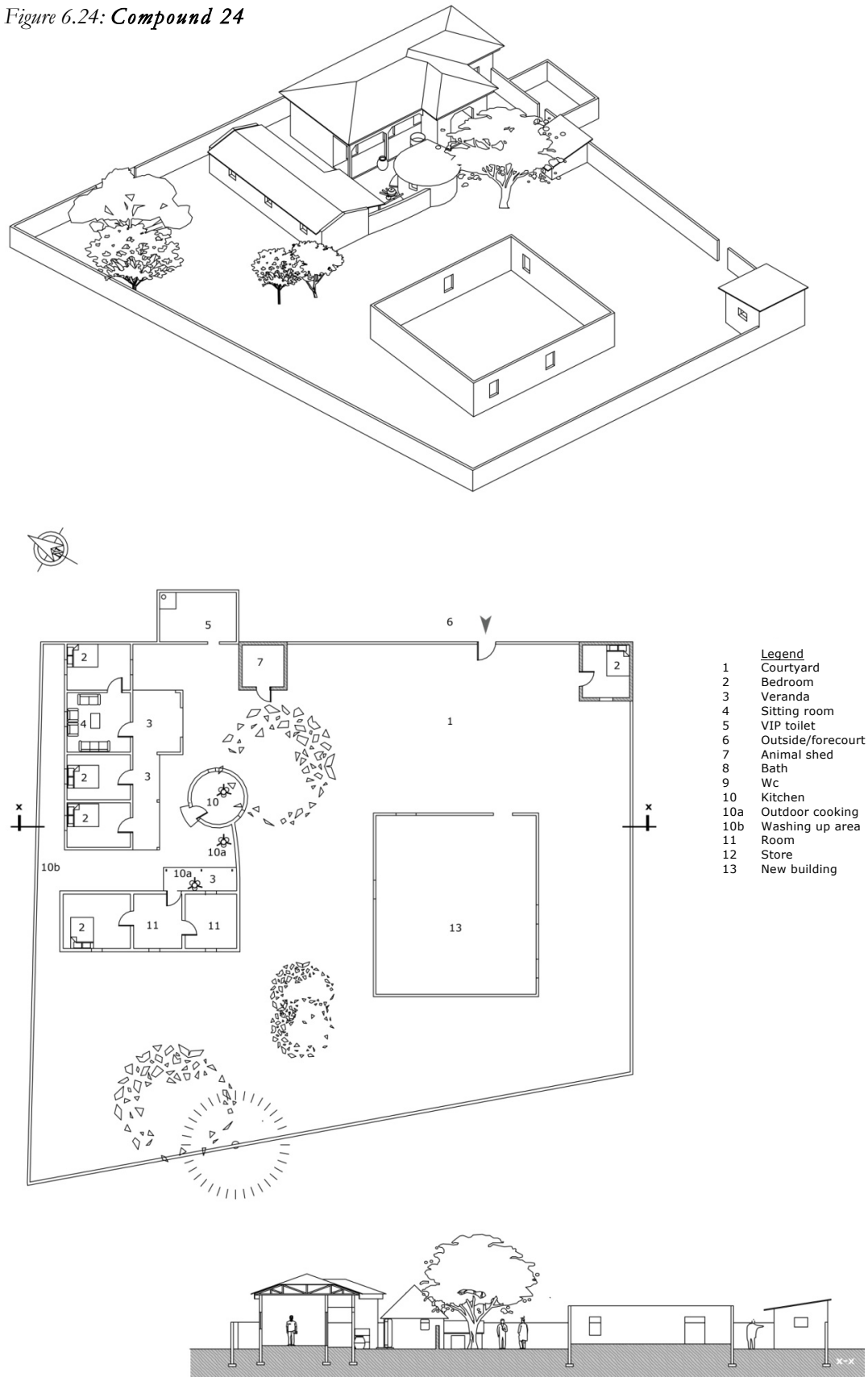


Figure 6.25: *Compound 25*

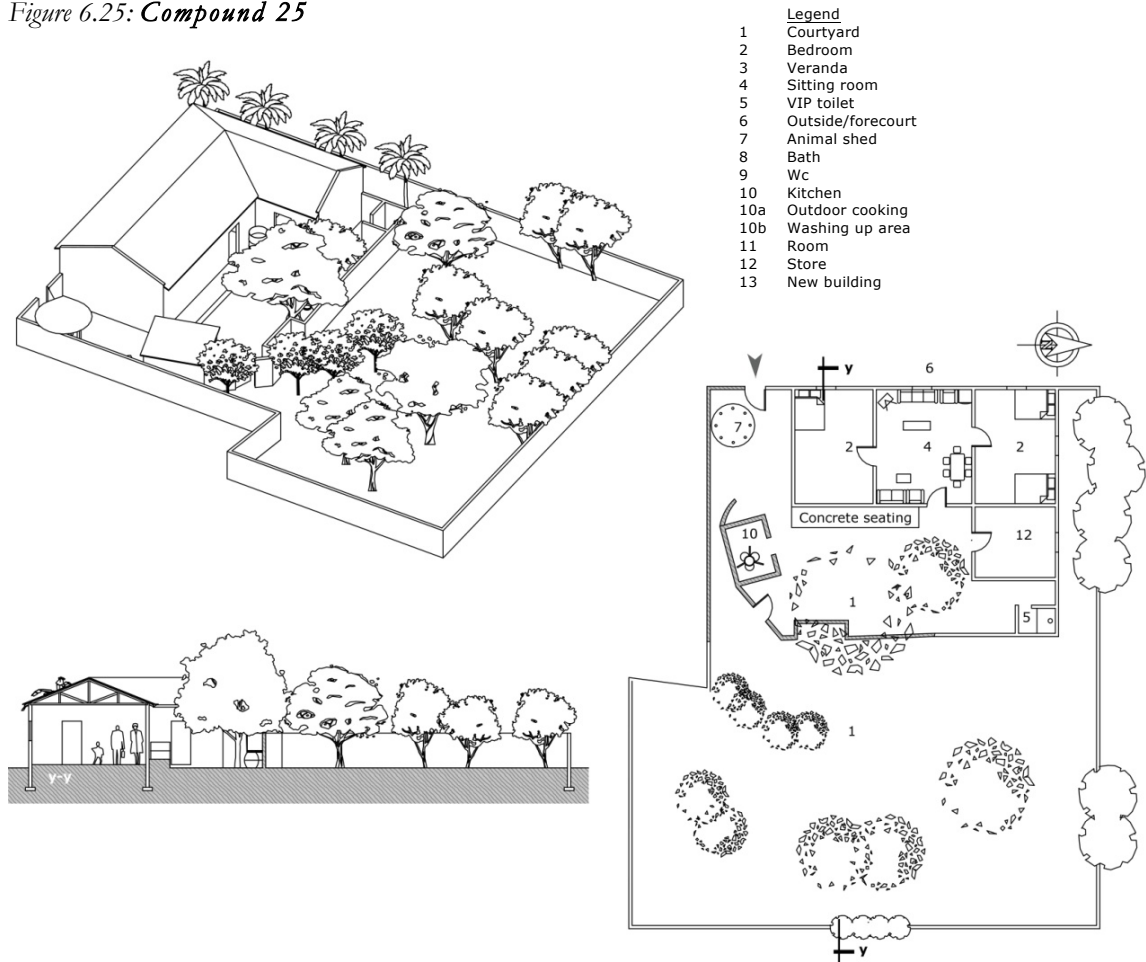


Figure 6.26: *Compound 26*

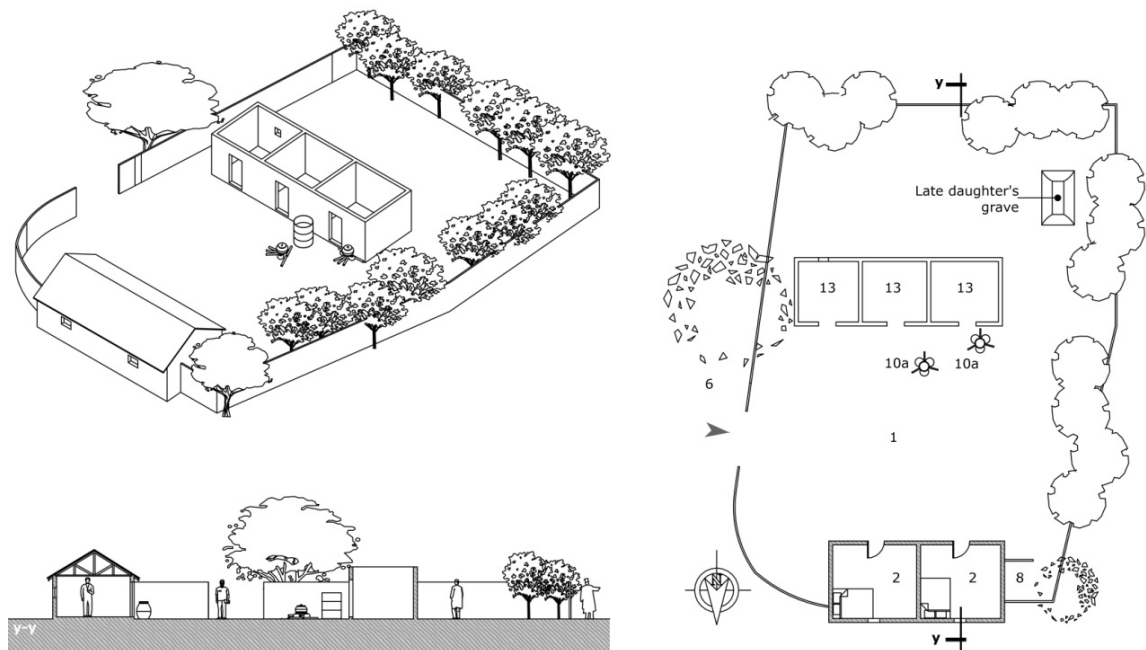


Figure 6.27: **Compound 27**

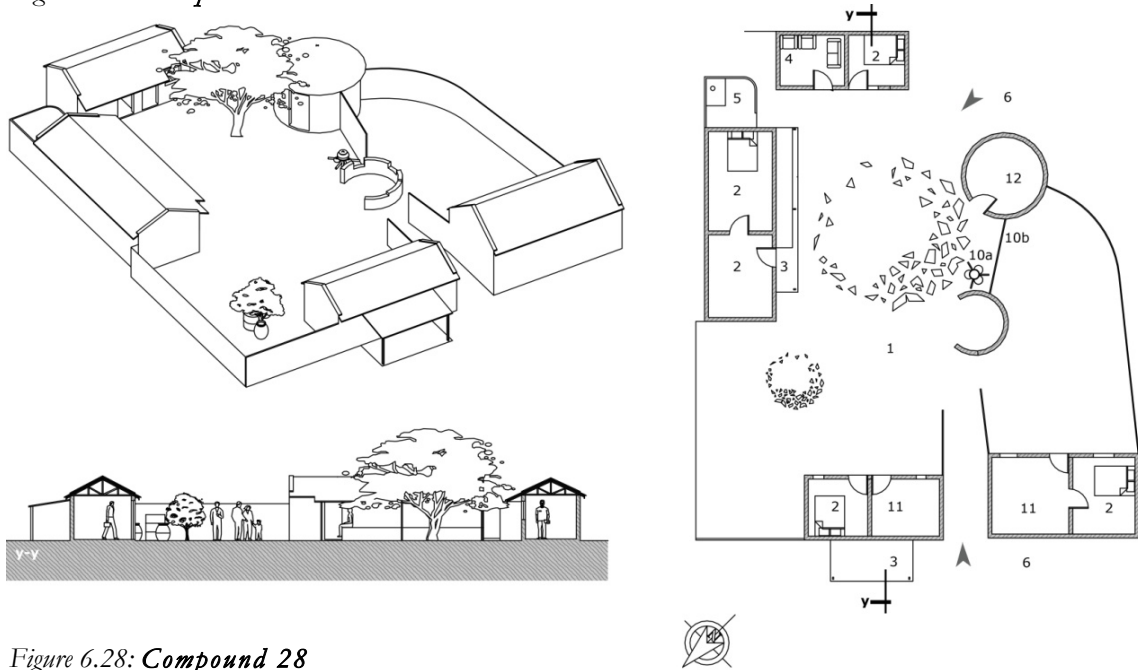


Figure 6.28: **Compound 28**

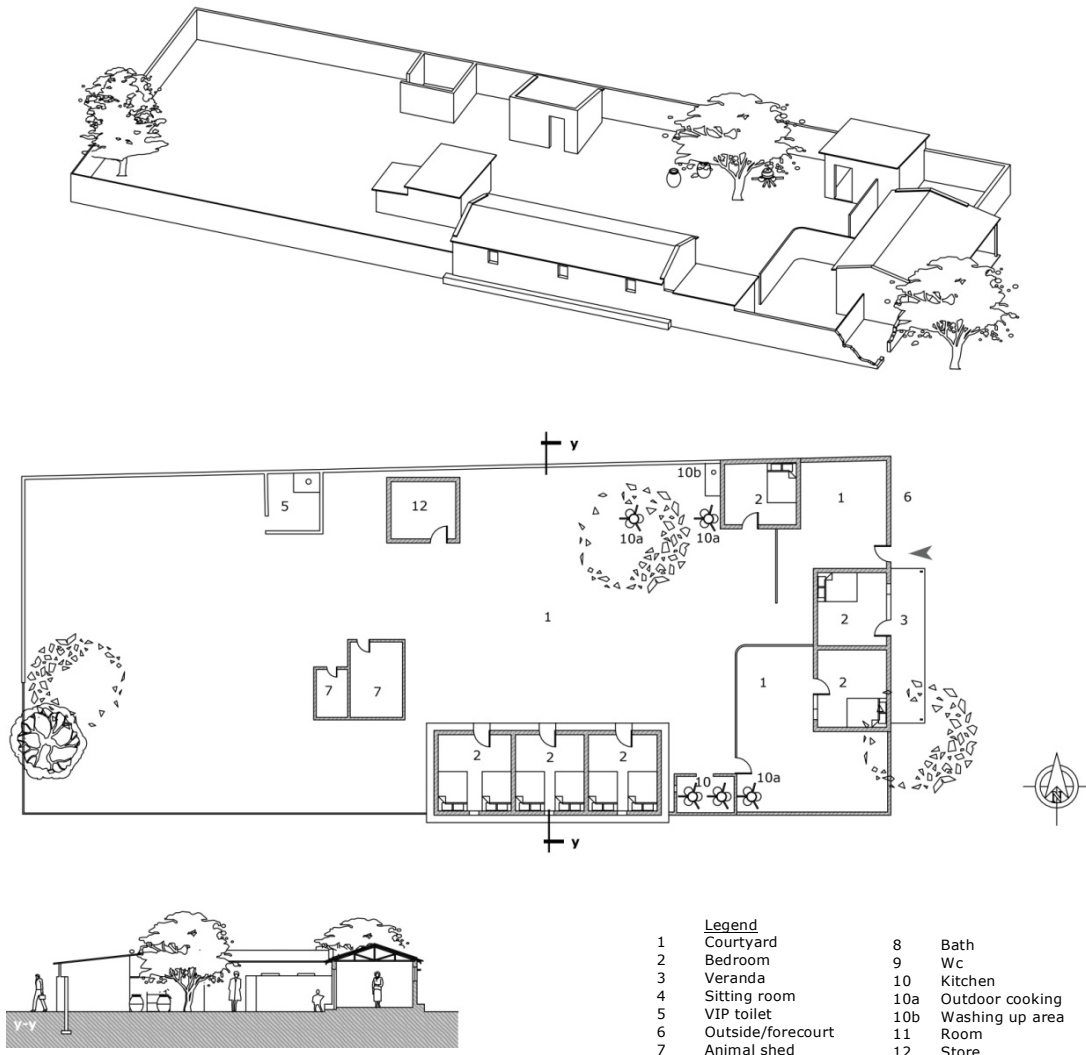


Figure 6.29: **Compound 29**

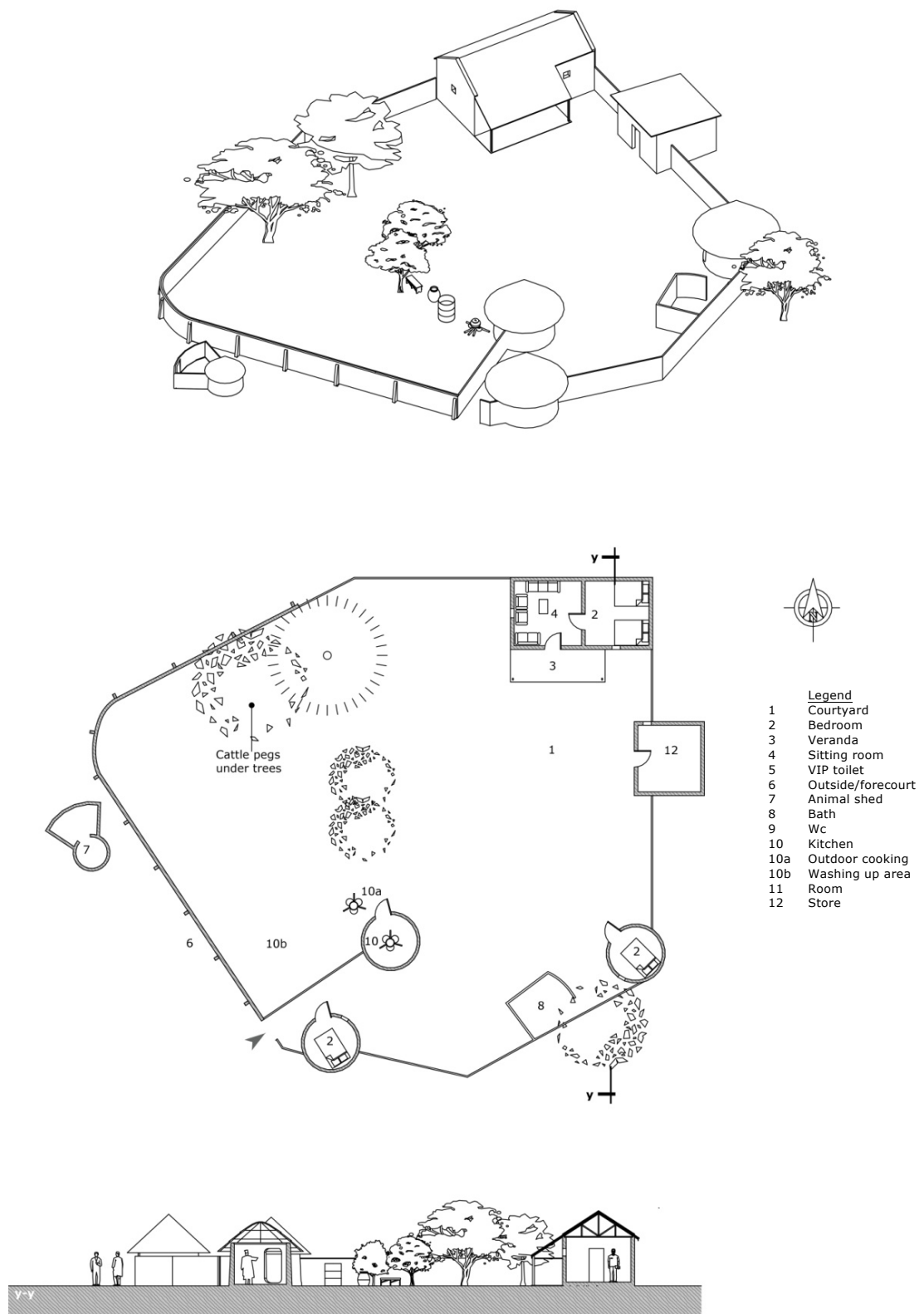


Figure 6.30: **Compound 30**

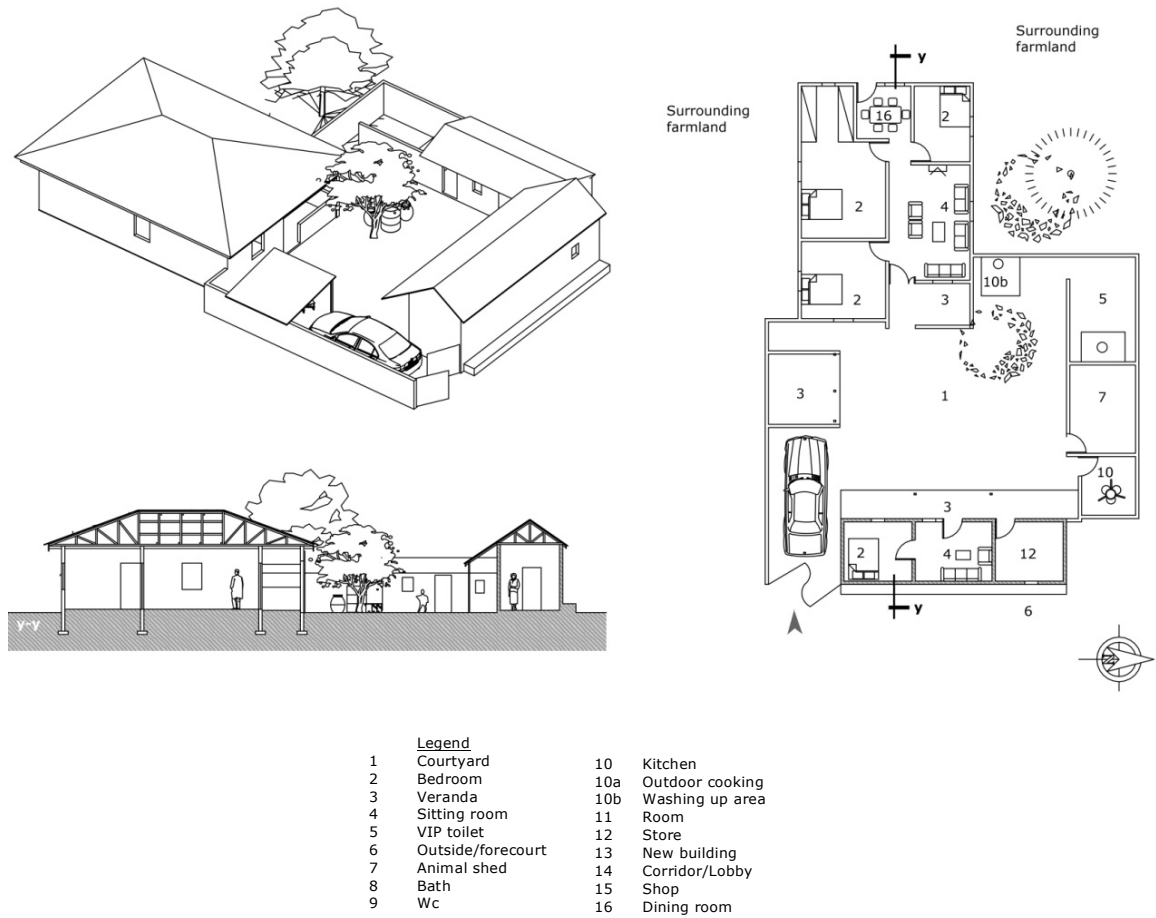


Figure 6.31: **Compound 31**

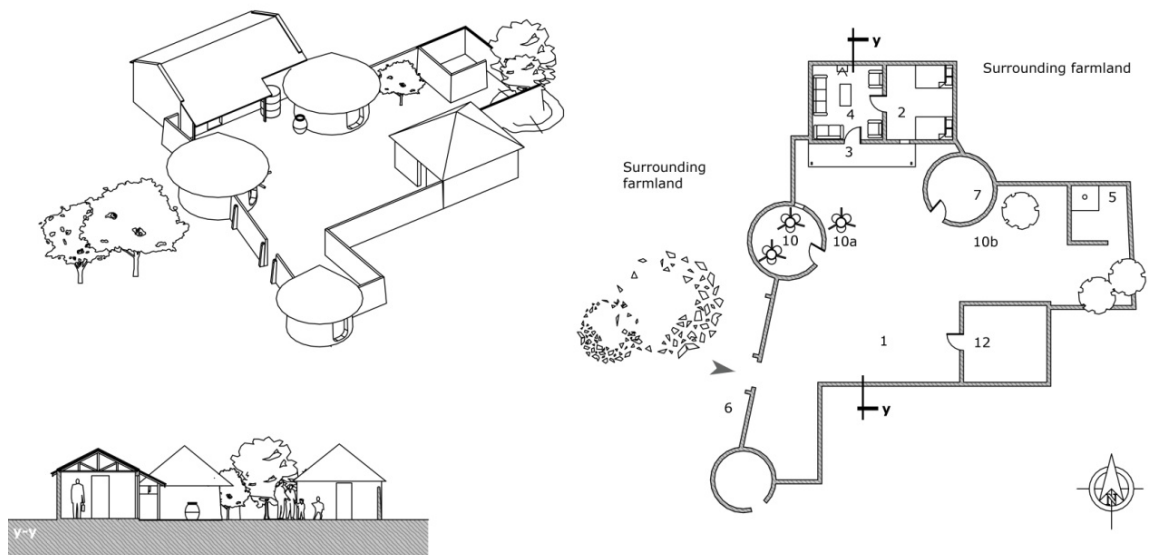


Figure 6.32: **Compound 32**

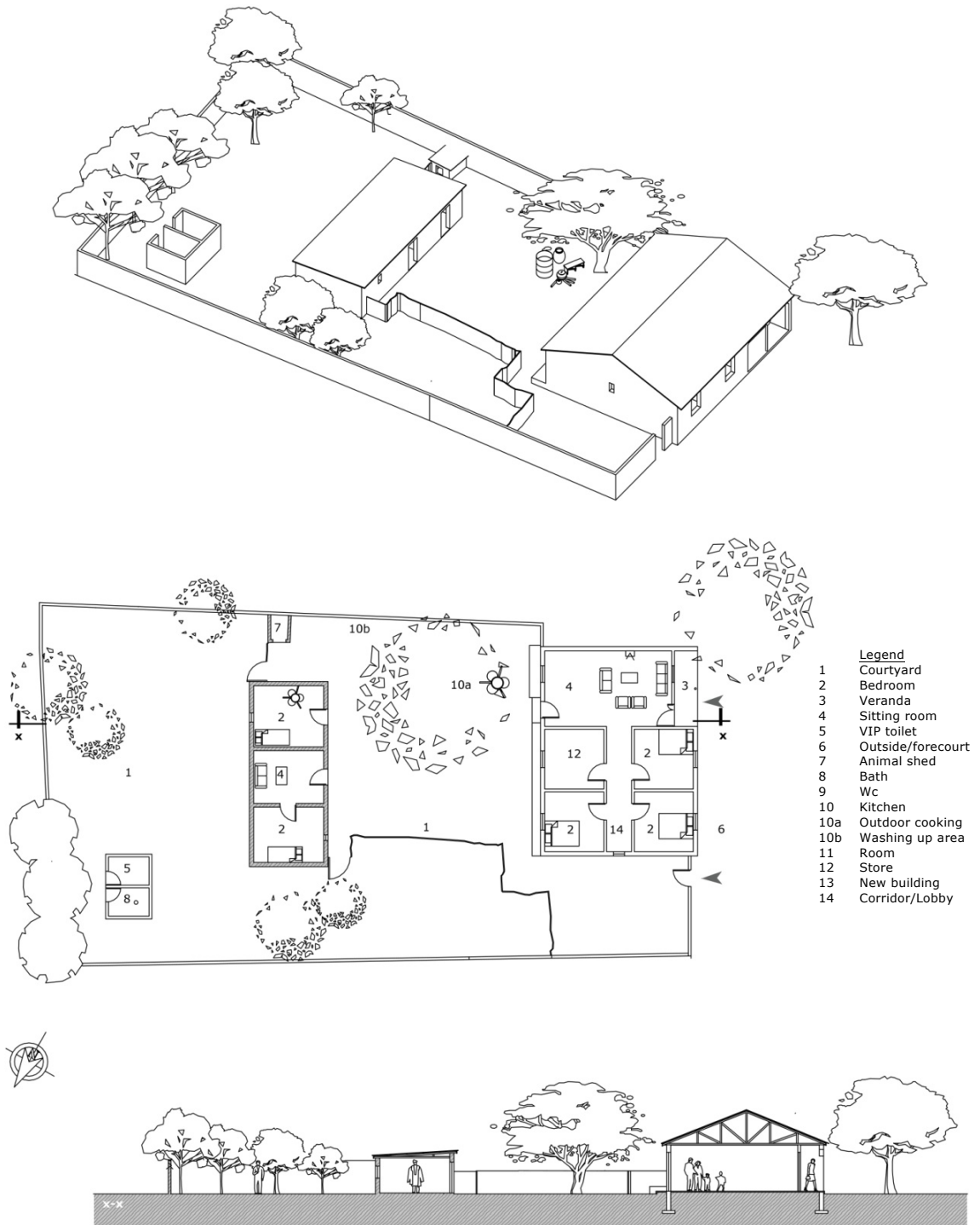


Figure 6.33: *Compound 33*

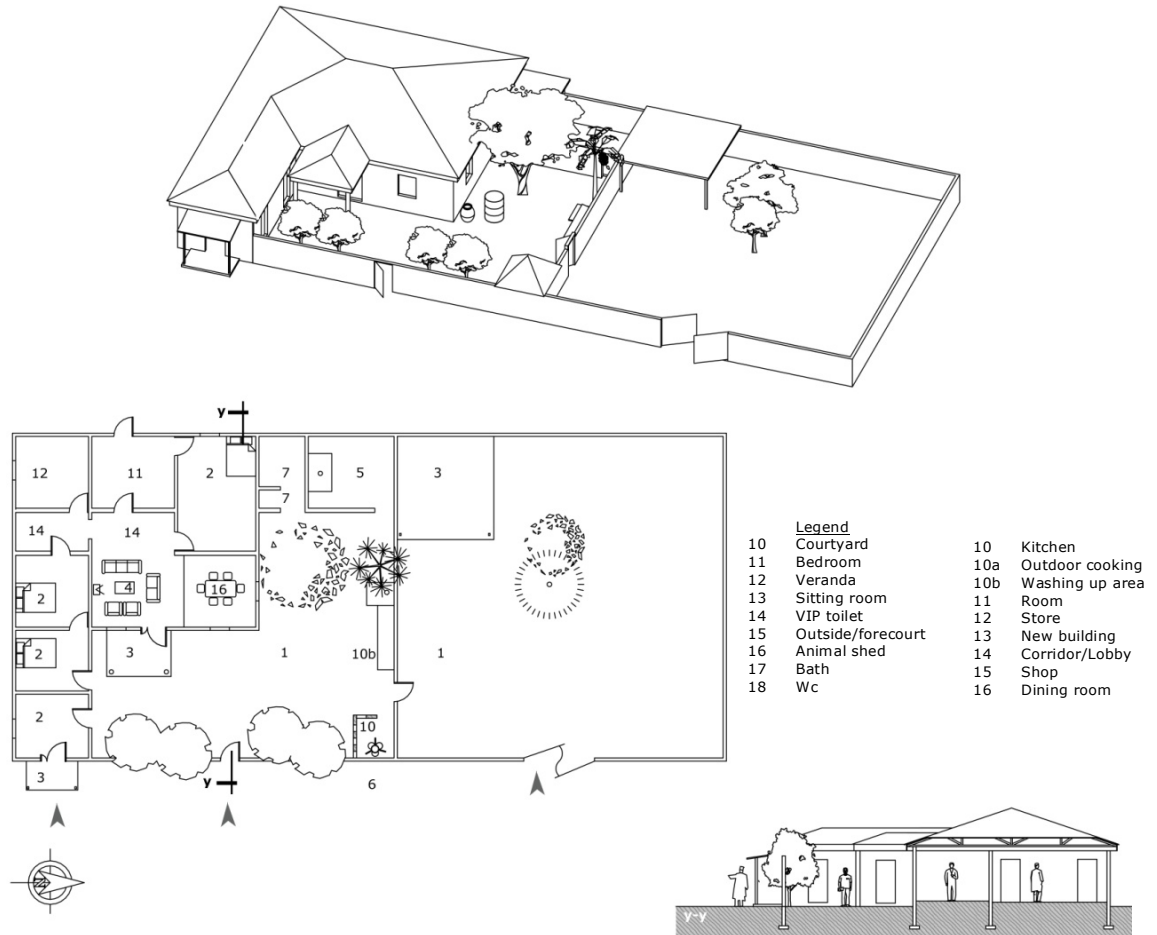
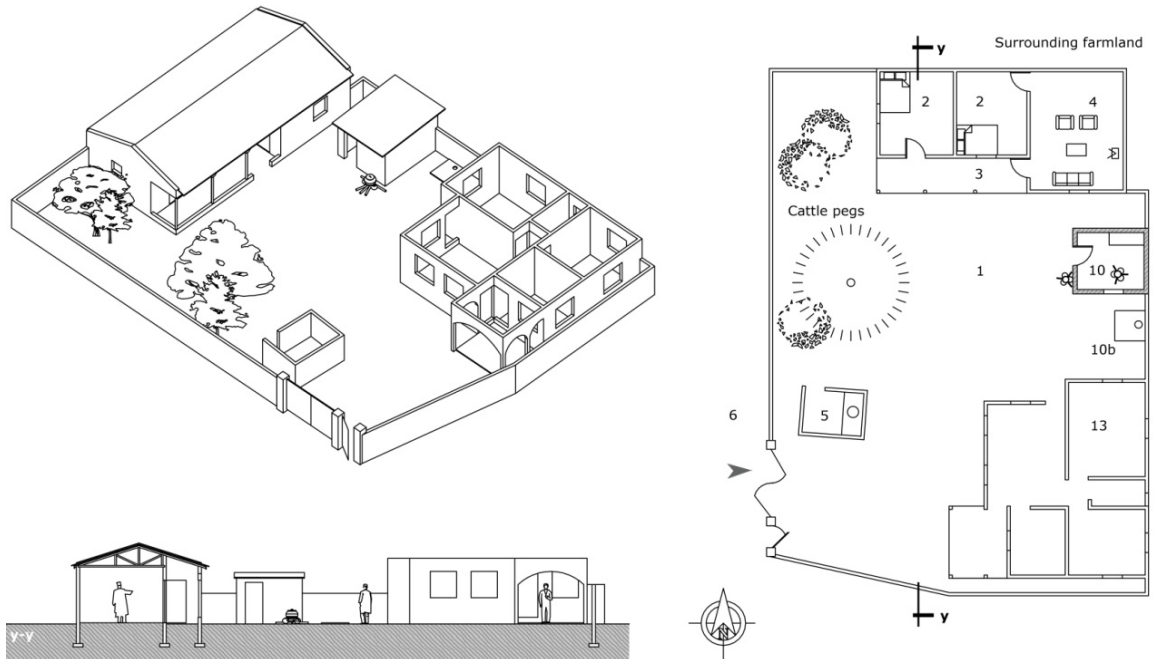


Figure 6.34: *Compound 34*



6.2.3 Rectangular houses and rooms constructed in concrete blocks and clad with corrugated iron sheets

Retired CHs who lived and worked in other urban towns of Nigeria after independence in 1960 mostly own compounds in the third category. Consequently, 5 out the 6 compounds are constructed in concrete hollow blocks on land purchased within occupied clan lands away from extended families (*Appendix 14*). These set of compounds contain rectangular rooms and houses frequently finished with cement plaster and emulsion paint lining the perimeters of compound walls (*Figures 6.35-40*). Boundaries of compounds encompass the entire plot within urban areas. Access to compounds are also via single entrances past small external forecourts as CHs frequently received guests in verandas directly facing entrances or in sitting rooms, with the notable exception of Compound 39. This compound is owned by a widow who built shops and rooms for rent to augment her family's income after the demise of her husband, thus the presence of multiple entrances (*Figure 6.39*). The forecourt is large and is employed to receive customers and guests to the rented rooms as the courtyard largely serves the family and tenants for many household activities such as cooking, washing up and leisure. Changing traditional values regarding the position of women illustrates influences of Christian beliefs and a legacy of the British legal system in the community. Five widows presently head compounds in this sample (*Appendix 14*). Furthermore, these compounds are constructed in part or whole in hollow concrete blocks from funds accruing from their late husbands' gratuities (Compounds 11, 39, 41, 43 and 45).

Trees within these compounds are purposely planted to provide shade within courtyards and forecourts in front of the compound (*Figures 6.36, 38-40*). This is unlike most compounds in the first two typologies largely because plots were purchased and developed *ab initio* according to the

needs and wishes of the owners unlike obtains in inherited lands. The most common types of trees in such compounds are mango, guava and umbrella trees (*Schefflera arboricola spp*) due to their economical value and large leaves which provide good shade as well as being easy to sweep and clean.

Figure 6.35: *Compound 35*

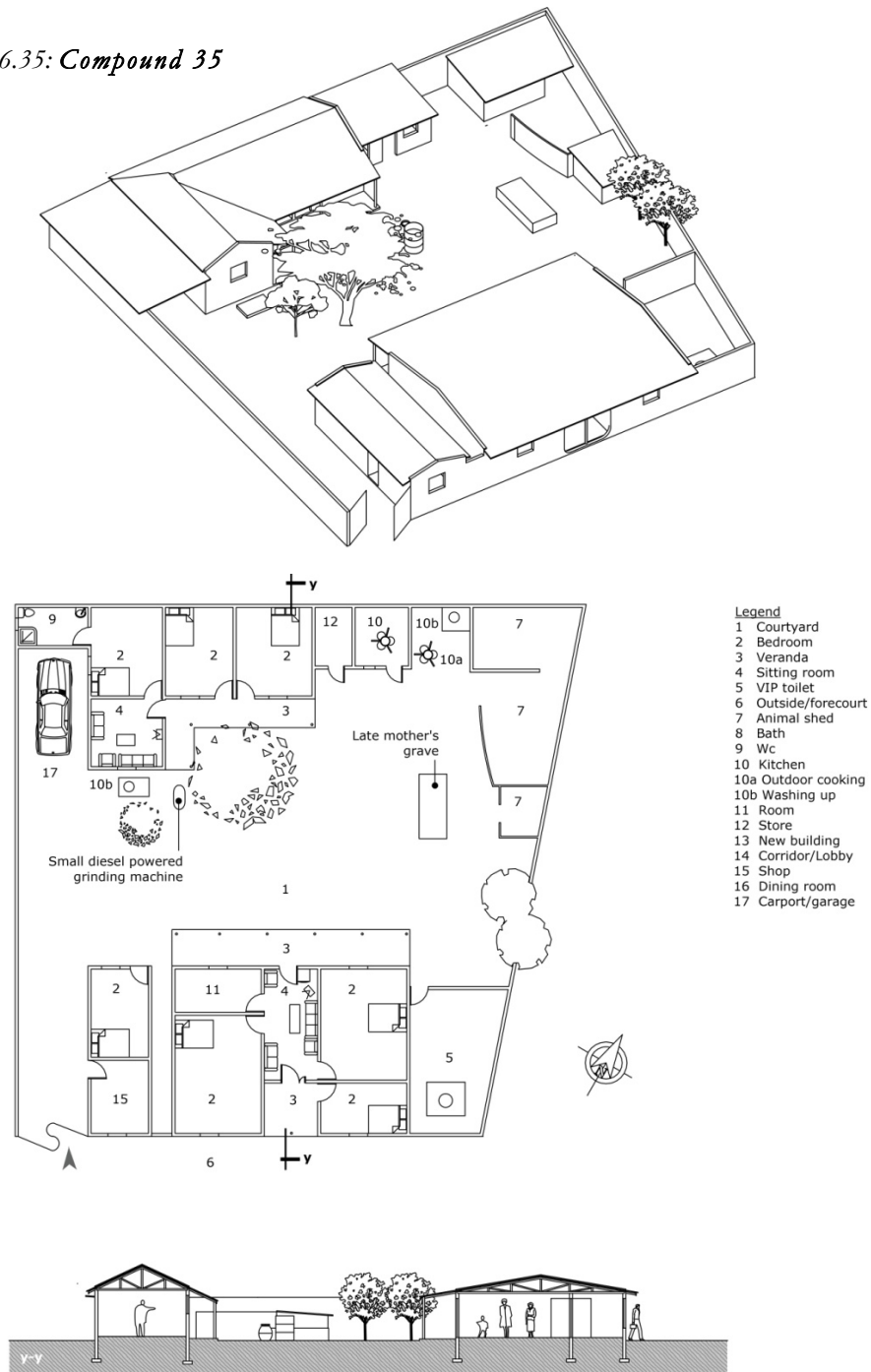


Figure 6.36: *Compound 36*

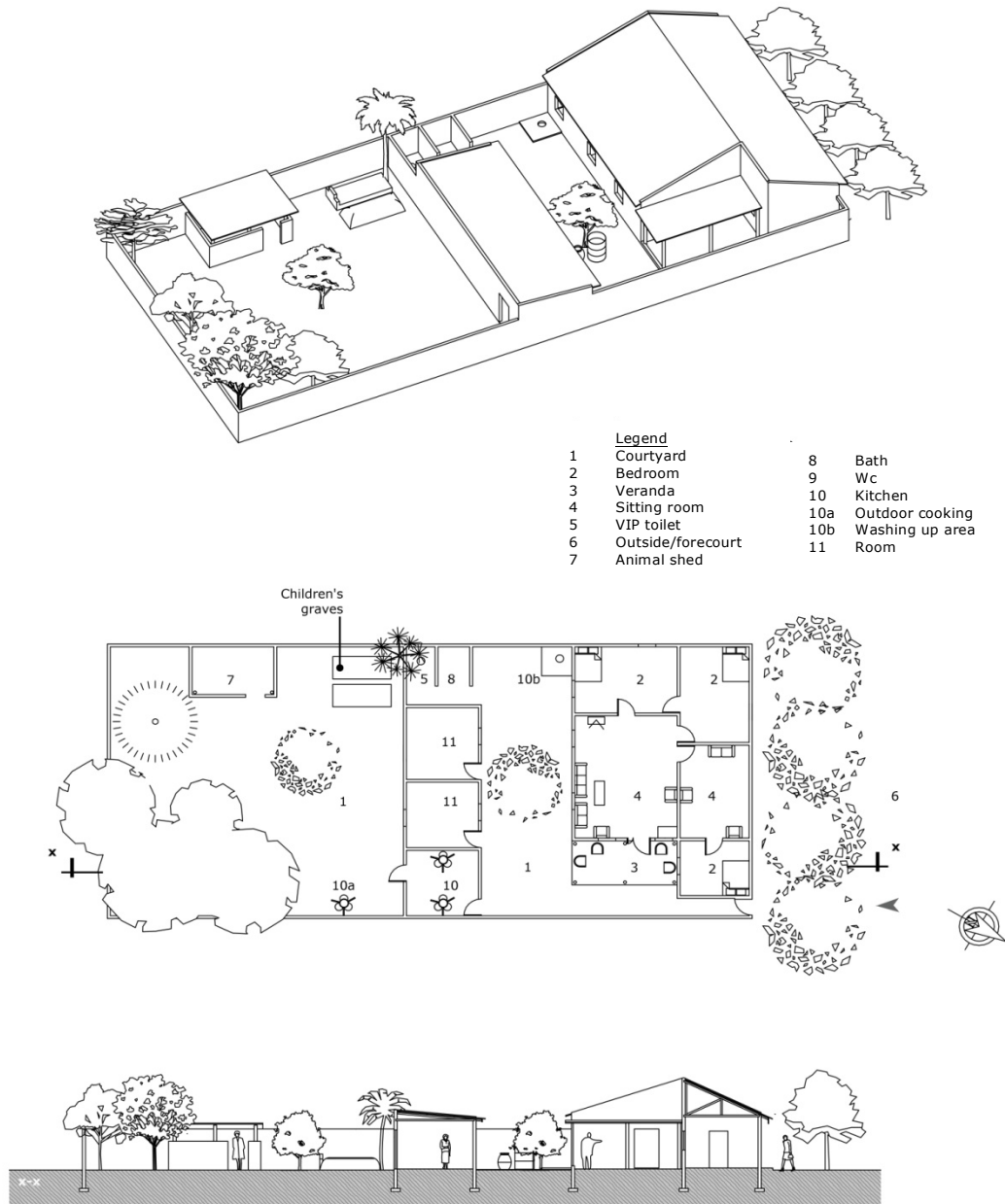


Figure 6.37: **Compound 37**

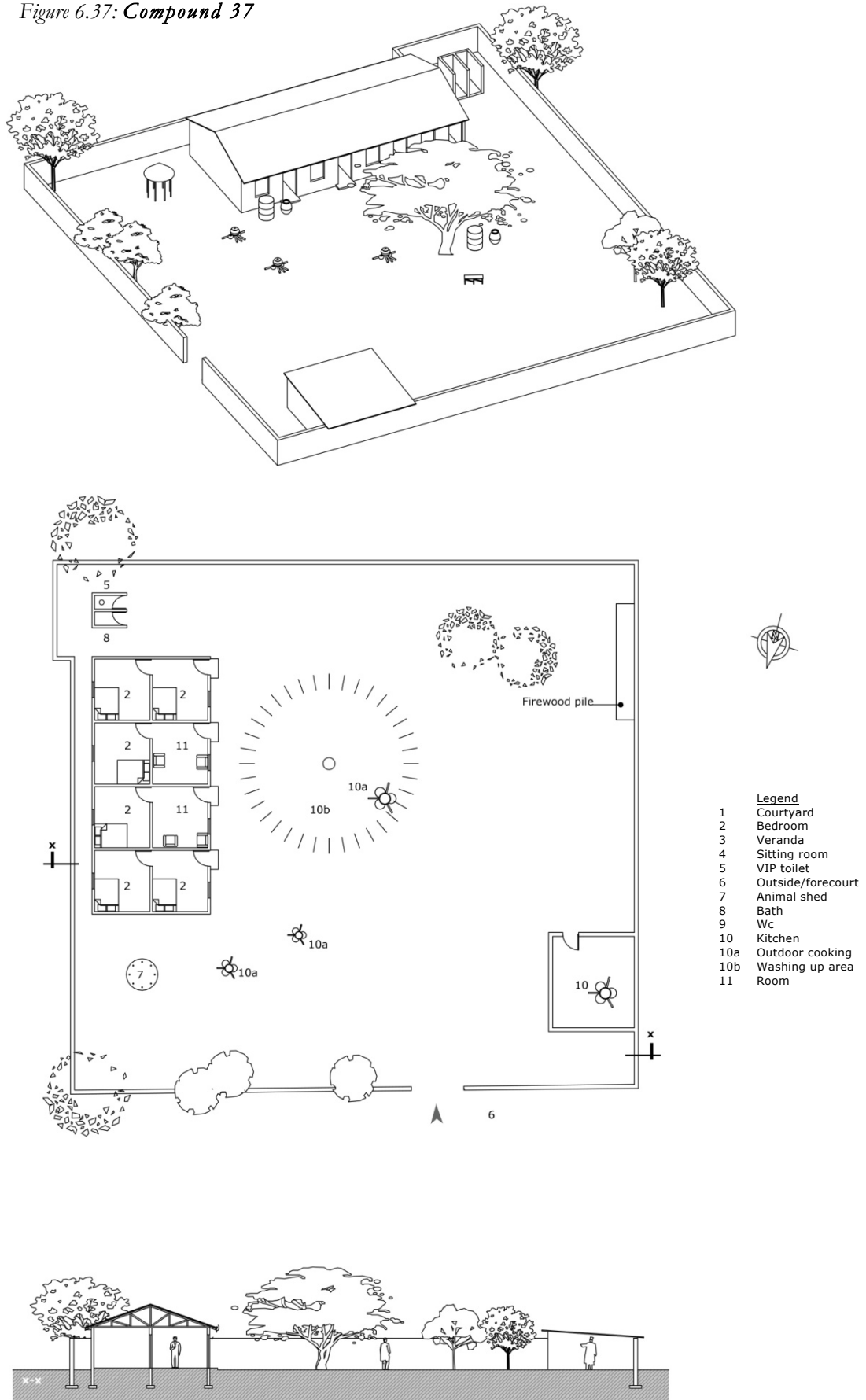


Figure 6.38: **Compound 38**

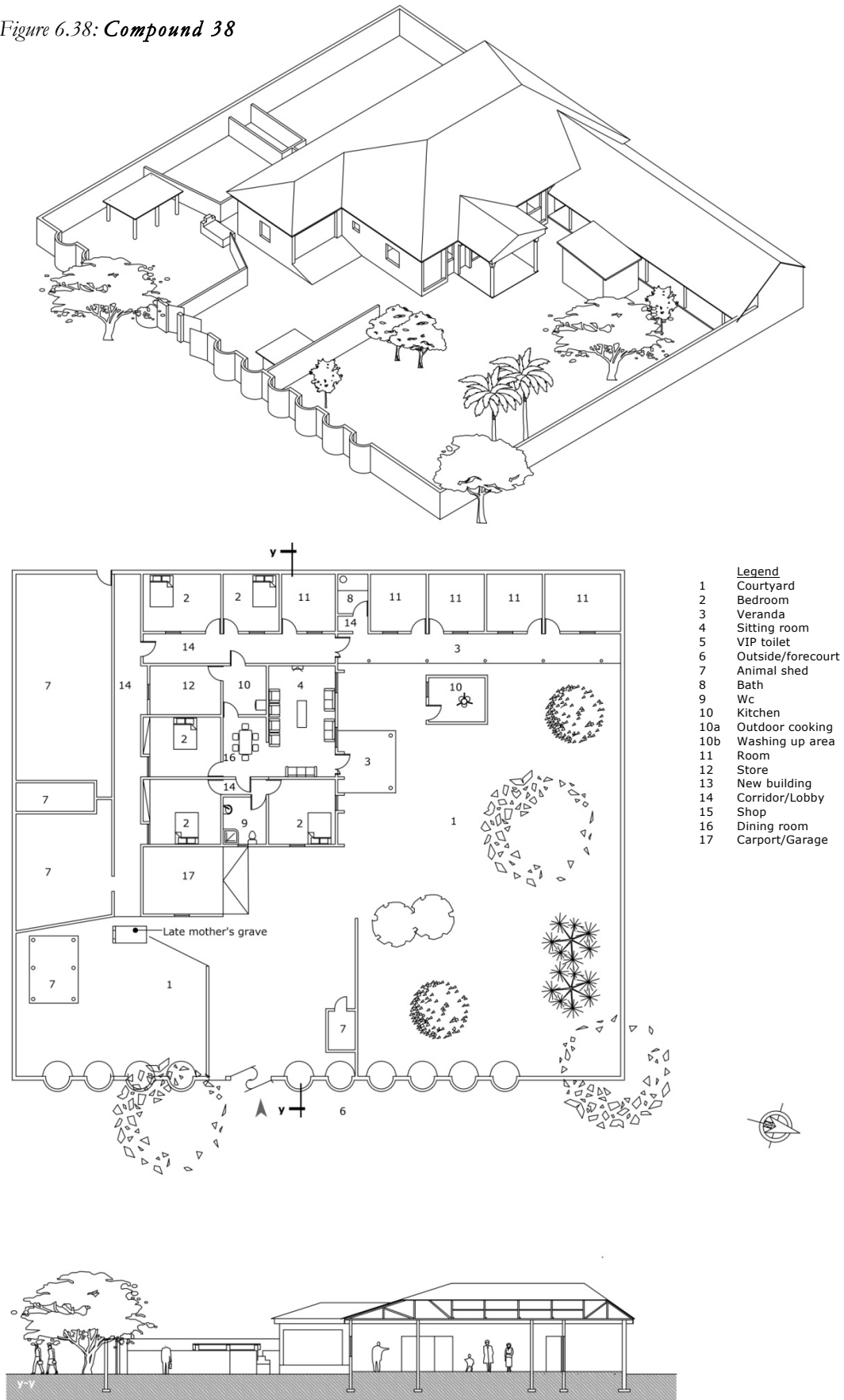


Figure 6.39: Compound 39

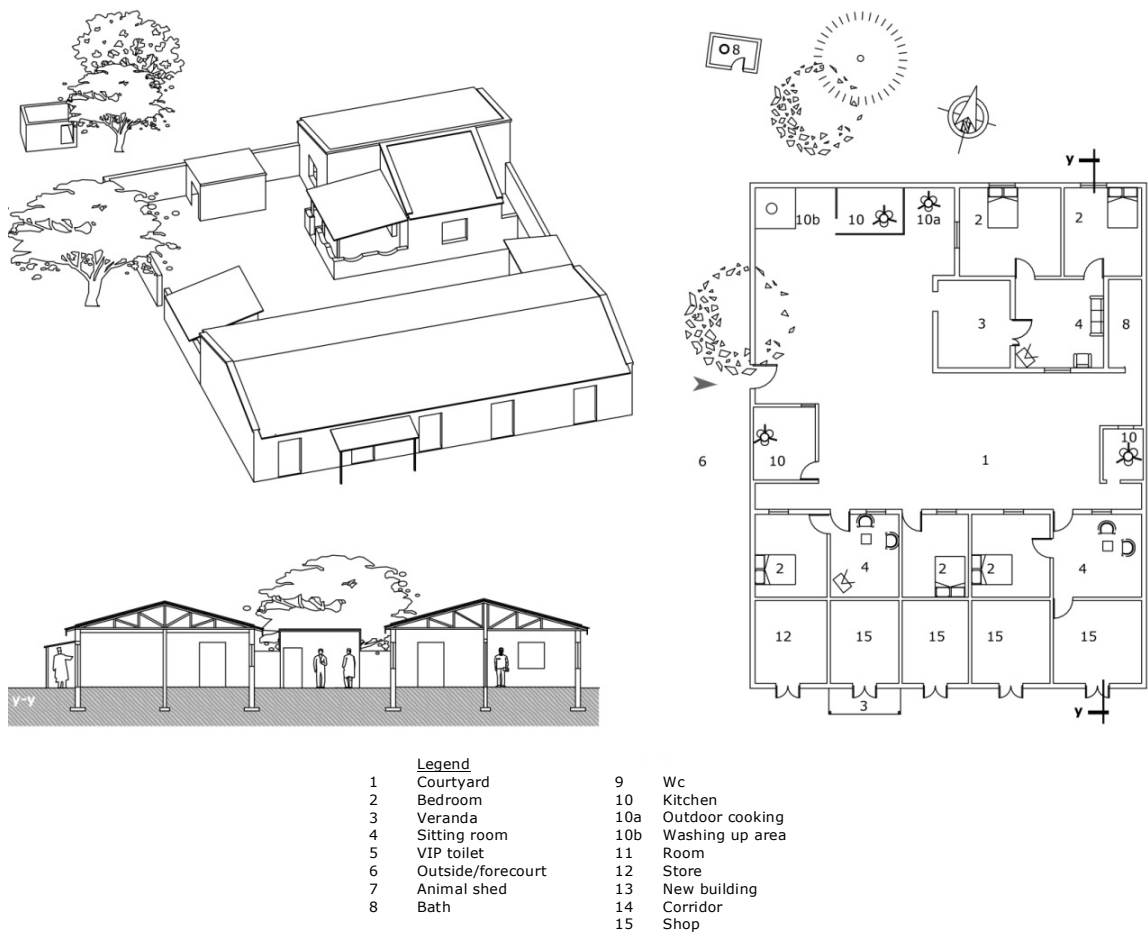
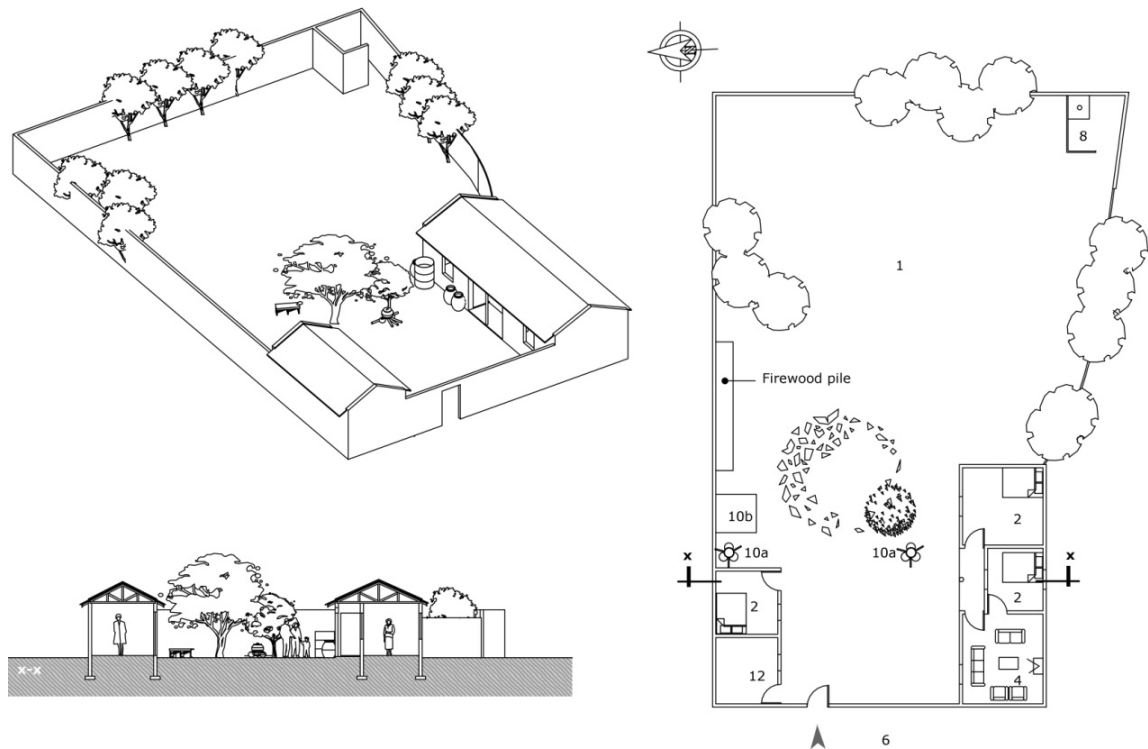


Figure 6.40: Compound 40



6.2.4 Freestanding concrete bungalows with zinc/aluminium cladding

This is the most recent typology with function specific spaces such as toilets, kitchens, garages or carports organized under a single roof in one bungalow. It accounts for 11.2% of the sample. The need for cross ventilation in a hot climate and relatively deep planning to accommodate indoor living compared to arranging rooms in a single row in part explains the need to locate the building away from compound walls on all sides, unlike housing units of previous typologies. This arrangement splits the courtyard into a front, back and side yards. The front yard is usually accessed through a single entrance from the outside and is used much in the same way as forecourts in the earlier typologies. The back and side yards usually contain cooking hearths and washing up areas traditionally associated with women while side yards are sometimes employed for services and animal husbandry (*Figures 6.41, 42, 44 and 45*). These compounds were designed by architects or other professionals in the building industry for the CHs, who lived and worked as civil servants or servicemen in urban cities in Nigeria before retirement or relocation back to the community. Similar to compounds in the preceding typology, all the CHs purchased the plots within occupied clan areas away from extended family influences. Compounds 41, 43 and 45 are owned by widows and are finished in cement plaster. The walls of Compounds 44 and 45 were not finished to the height their owners wanted at the time of the study but were sufficient enough to clearly delineate the entire plot and mark the extents of the property.

Although open courtyards still accommodate many household activities, the use of other spaces within the bungalow, such as sitting rooms cannot be over looked (*Appendix 10*). This in part arises from the convenience of having many spaces within easy distances. Bedrooms, sitting rooms and courtyards are however still largely used in multifunctional ways.

This typology is a reflection of the changing pattern of western living and culture imported into the community by returning retired indigenes who had lived within government provided bungalows in larger urban centres of Nigeria. Bungalow styles were imported from India into the Nigerian urbanscape through colonial administrators when the British ruled the country from 1900. Its origins lie in the early attempts of British military engineers in the 18th Century to design a standardized and permanent dwelling based on indigenous domestic structures for the East India Company when the British still traded in the subcontinent (Desai and Desai, 2011). This later metamorphosed into a low, one-storey, spacious internally divided building with a veranda all round, situated within a large compound. "This basic model was also adopted with modifications almost everywhere British Imperial rule existed at that time" (Desai and Desai 2011:26).

In Tangale land, such modifications involved limiting verandas to entrances from the front and back yards as well as the bungalows' central location within open courtyards with walls delineating the entire plot (*Figures 6.41-42, 44-45*). Verandas located to the front links sitting rooms to forecourts, replicating the relationship between male dominated spaces of traditional times where visitors rooms and forecourts face the front or entrances to compounds largely for surveillance and security purposes (*Figures 6.5, 6.12*). Verandas to the back of these bungalows link dining rooms and kitchens to backyards, which accommodate functions traditionally associated with the female gender such as food preparation, outdoor cooking and washing up. Centrally placing the bungalow facilitated the creation of a second 'internal' forecourt within compound walls, minimizing the role played by external forecourts, *tal mana* especially in urban towns. Heads of compounds 42 and 44 however intend to construct shops within the external forecourts.

"I want to maximize the potential of my tal mana by constructing some shops along the compound wall to the front. This will not only provide

additional income but will ensure constant surveillance to my entrance at all times" (Head, Compound 44).

Figure 6.41: **Compound 41**

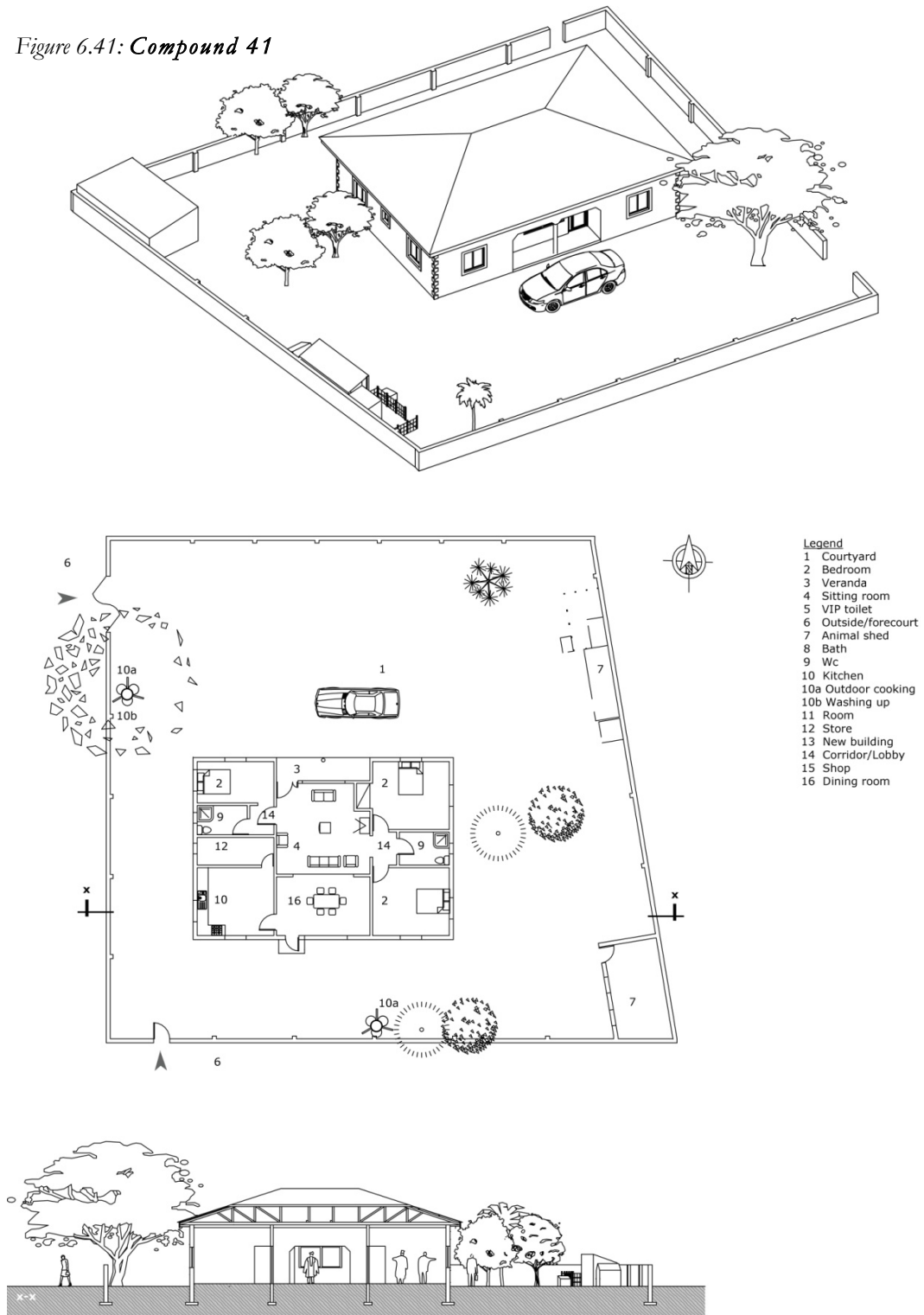


Figure 6.42: Compound 42

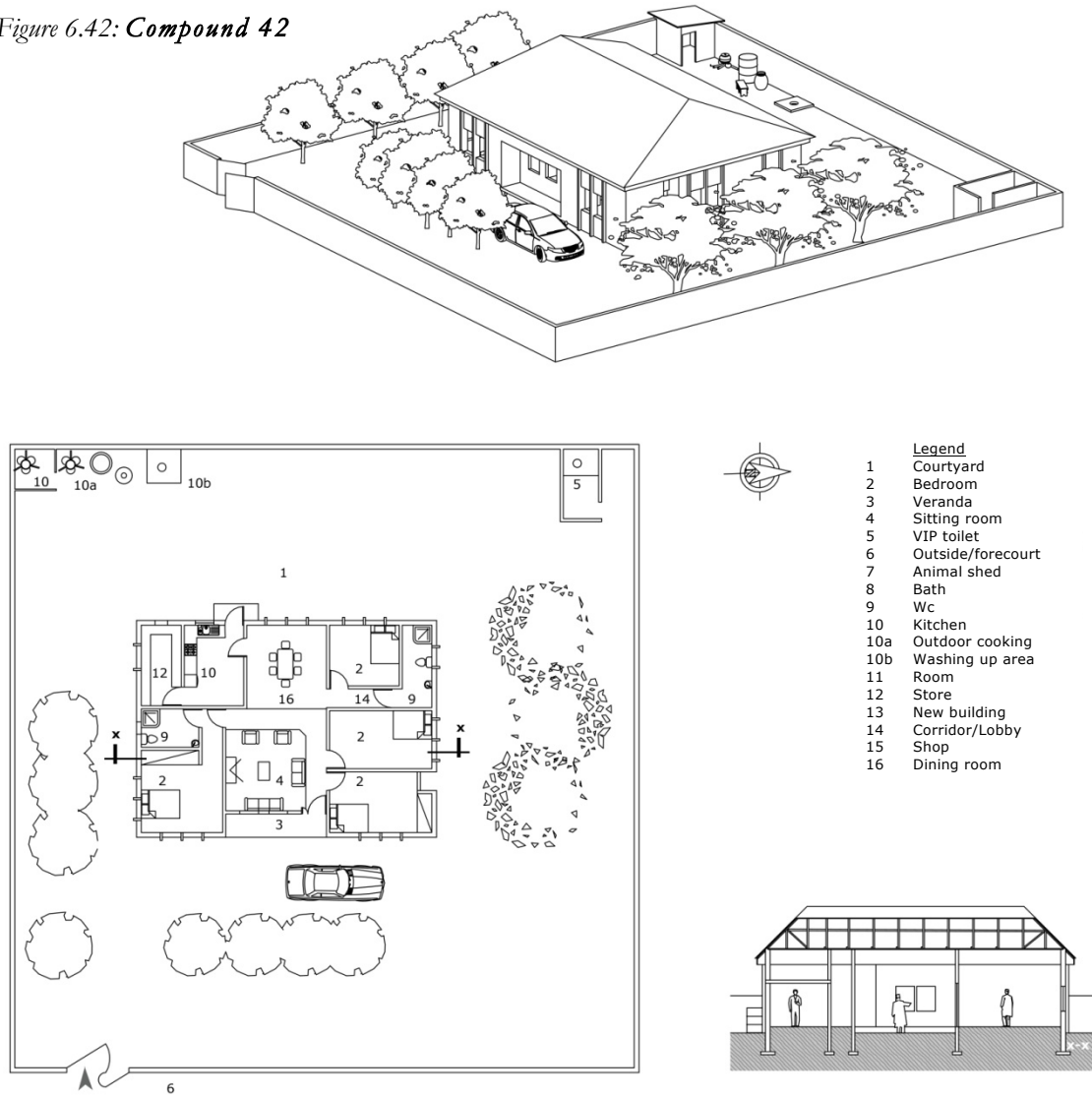


Figure 6.43: Compound 43

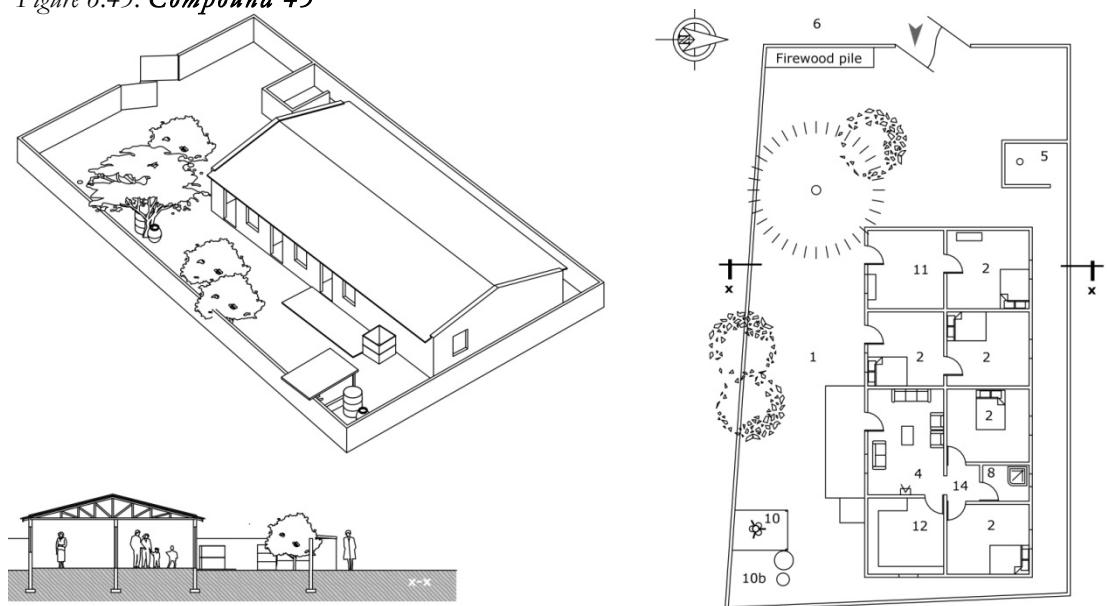


Figure 6.44: Compound 44

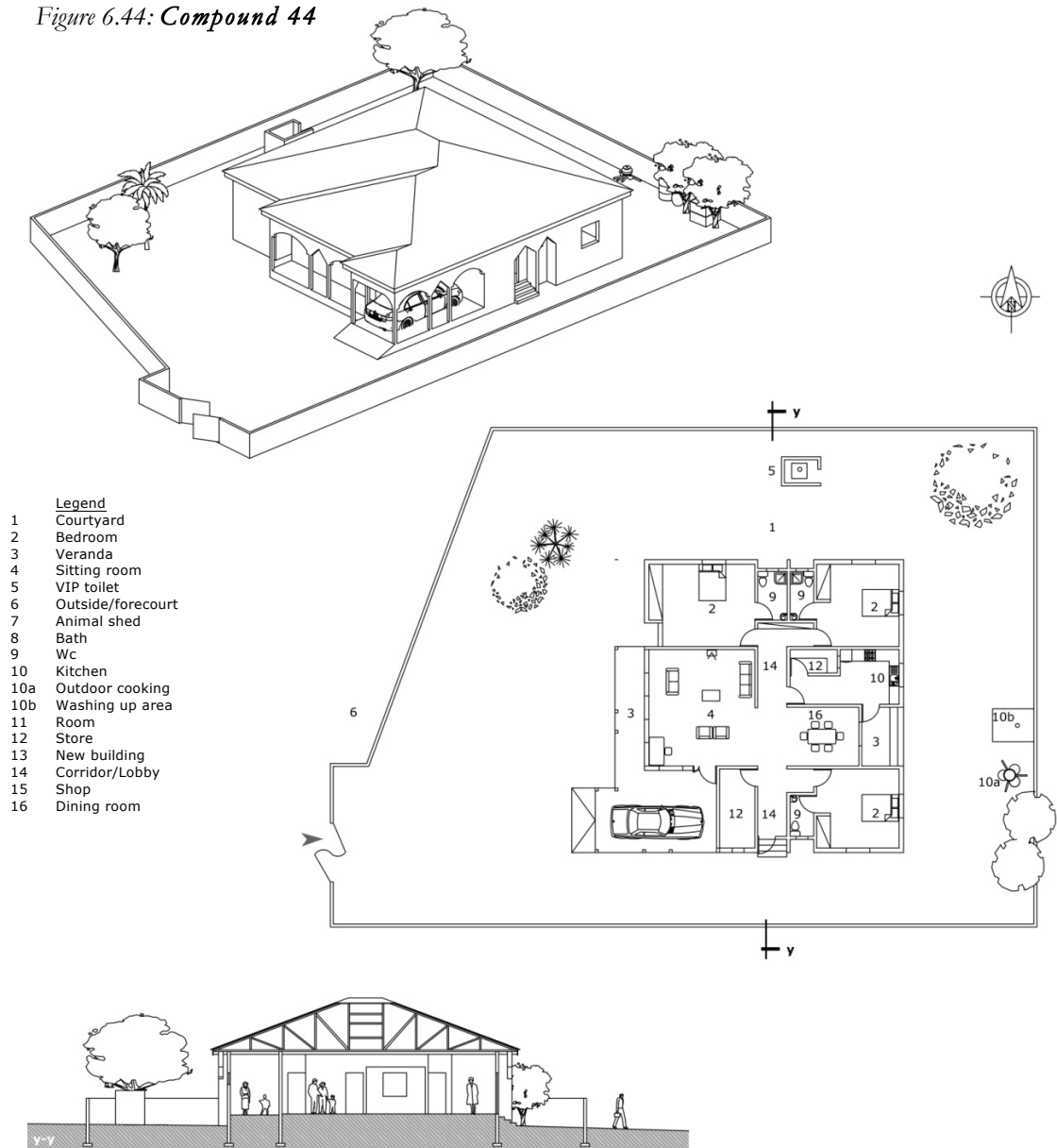
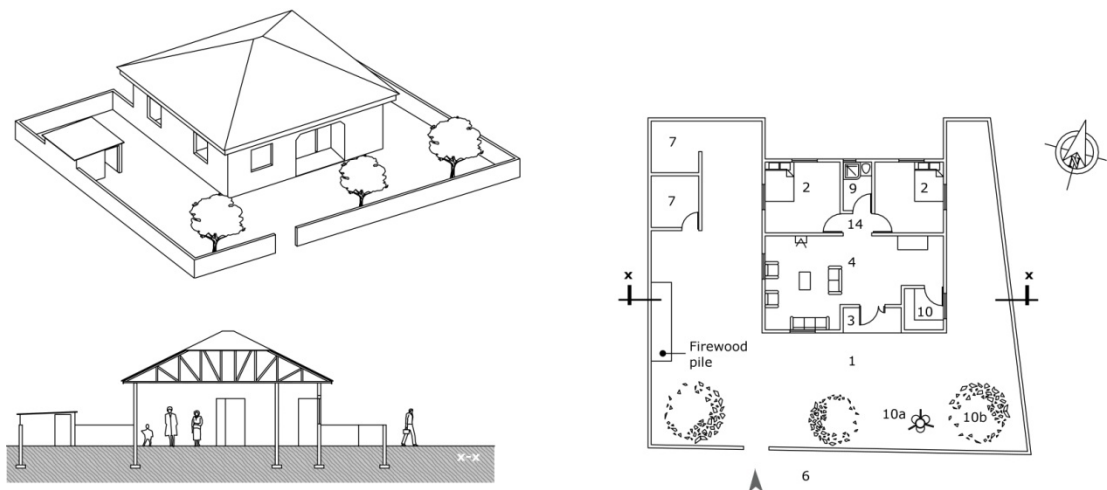


Figure 6.45: Compound 45



6.3 The open courtyard, most integrated space

This section discusses results of space syntax analyses to quantitatively test the hypothesis that the open courtyard has been maintained over the course of housing transformations. The analyses confirm the courtyard as the most integrated space for 80% of measured compounds. The open courtyard also has the highest average integration value of 2.05 across the sample (Tables 6.2-3).

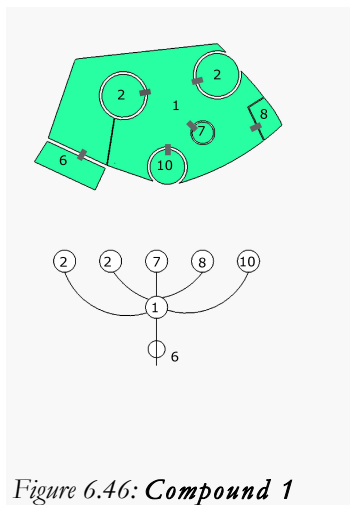
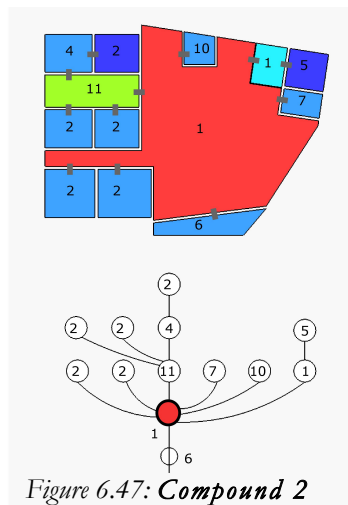
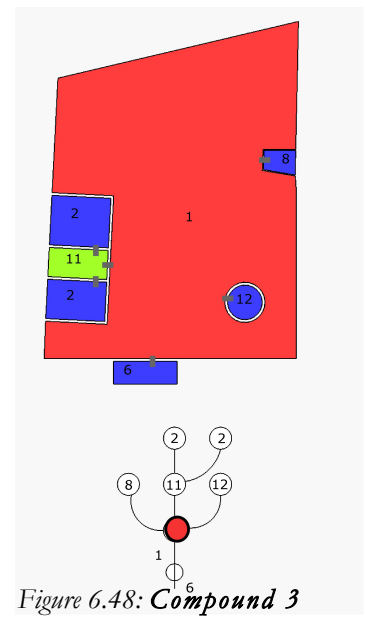
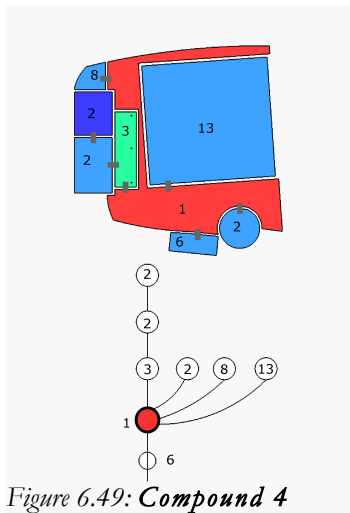
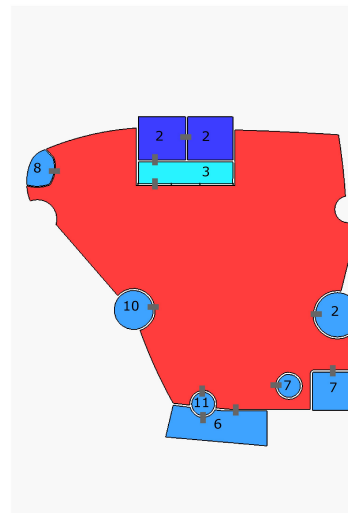
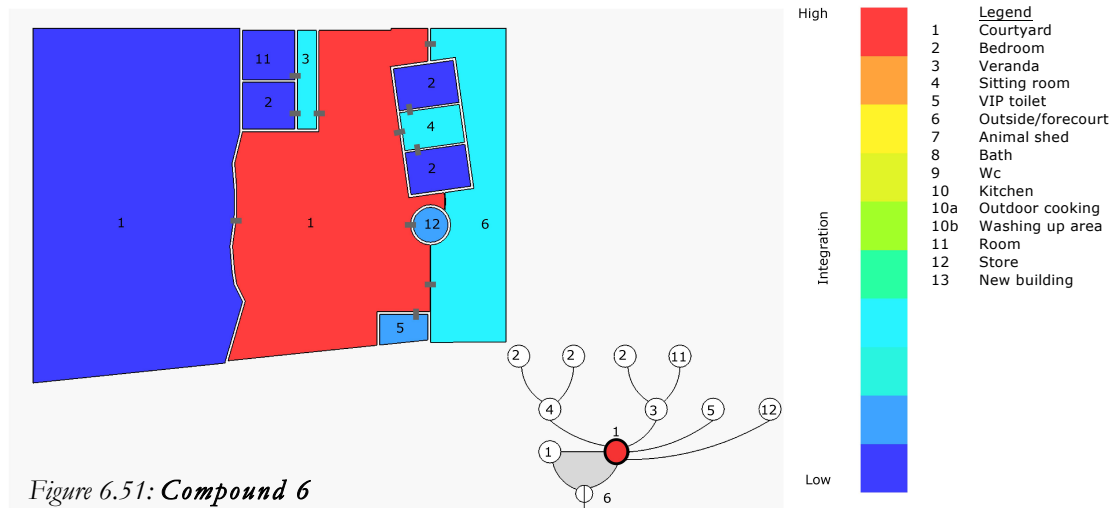
Table 6.2: *Most integrated spaces in the community sample from Appendix 8*

S/No	Function	Abbreviation	No	%	Compound no
1	Courtyard	Ct	36	80	2-14, 17-25, 27-37, 43
2	Sitting room	Sr	3	6.67	41, 42, 45
3	Others	—	3	6.67	1, 15, 26
4	Veranda	Vr	1	2.2	38
5	Kitchen	Kt	1	2.2	16
6	Corridor	Co	1	2.2	44
<i>Total</i>			45	100	

Table 6.3: *Functions and integration values in the community sample*

S/No	Function	Abbrev	No	Av. IV	S/No	Function	Abbrev	No	Av. IV
1	Courtyard	Ct	71	2.05	10	Kitchen	Kt	44	1.04
2	Bedroom	Br	166	0.81	11	Room*	Rm	37	1.11
3	Veranda	Vr	55	1.34	12	Store	St	30	0.88
4	Sitting room	Sr	39	1.08	13	New building	Nb	7	0.87
5	VIP toilet	Vp	32	0.95	14	Corridor	Co	15	0.8
6	Outside space	Ø	45	1.04	15	Shop	Sh	7	0.7
7	Animal shed	An	36	0.98	16	Dining room	Dr	6	0.67
8	Bath	Bt	19	0.92	17	Carport/Garage	Cp	3	1.11
9	Wc	Wc	10	0.23	<i>Total</i>				622
*Rooms had no specific functions; they were frequently used for sleeping and/or storage or used as the need arises. Adapted from Maina (2013a).					<i>Av IV</i>				1.11

Three functions appear in every compound surveyed. These include the outside space or forecourt, courtyard and bedroom. Three other function spaces—the bath, kitchen and veranda were found in 44, 42 and 40 compounds respectively. Together, these are suggestive of basic spaces of a contemporary Tangale compound without which a house may not be considered functionally complete.

Convex maps and Justified Permeability Graphs of surveyed compoundsFigure 6.46: *Compound 1*Figure 6.47: *Compound 2*Figure 6.48: *Compound 3*Figure 6.49: *Compound 4*Figure 6.50: *Compound 5*Figure 6.51: *Compound 6*

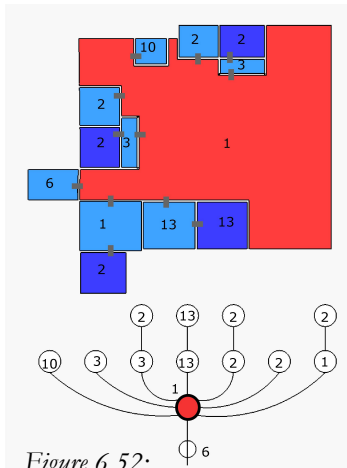


Figure 6.52:
Compound 7

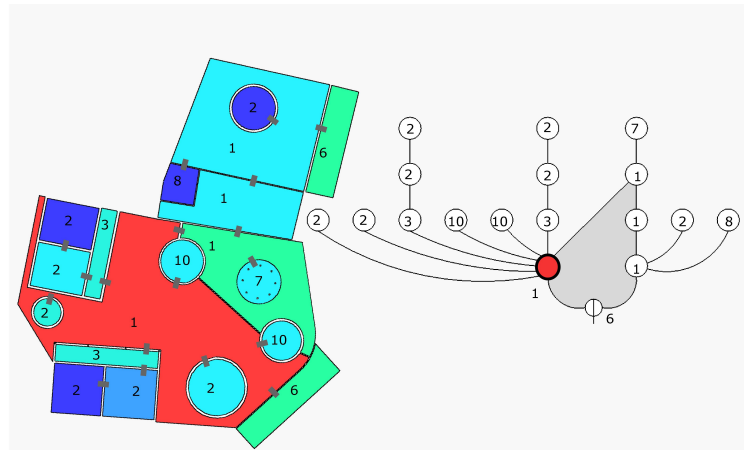


Figure 6.53: **Compound 8**

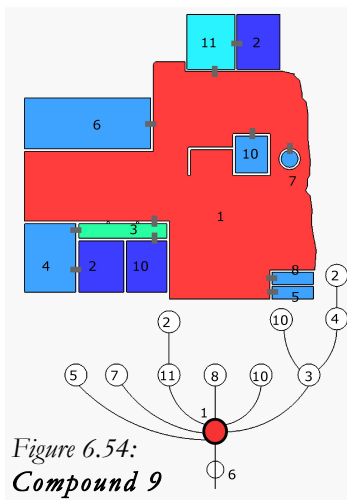


Figure 6.54:
Compound 9

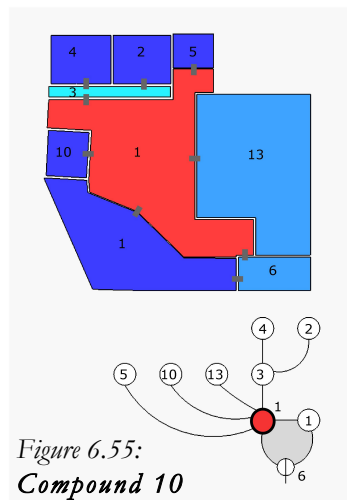


Figure 6.55:
Compound 10

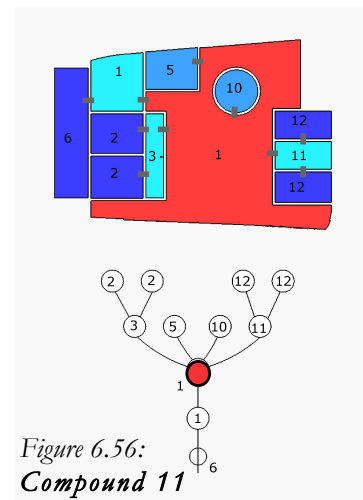


Figure 6.56:
Compound 11

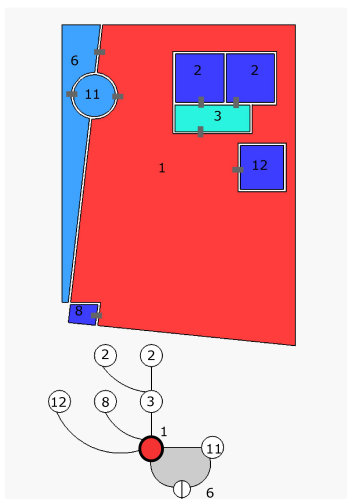


Figure 6.57: **Compound 12**

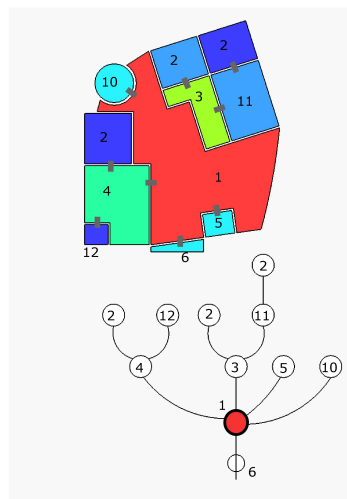
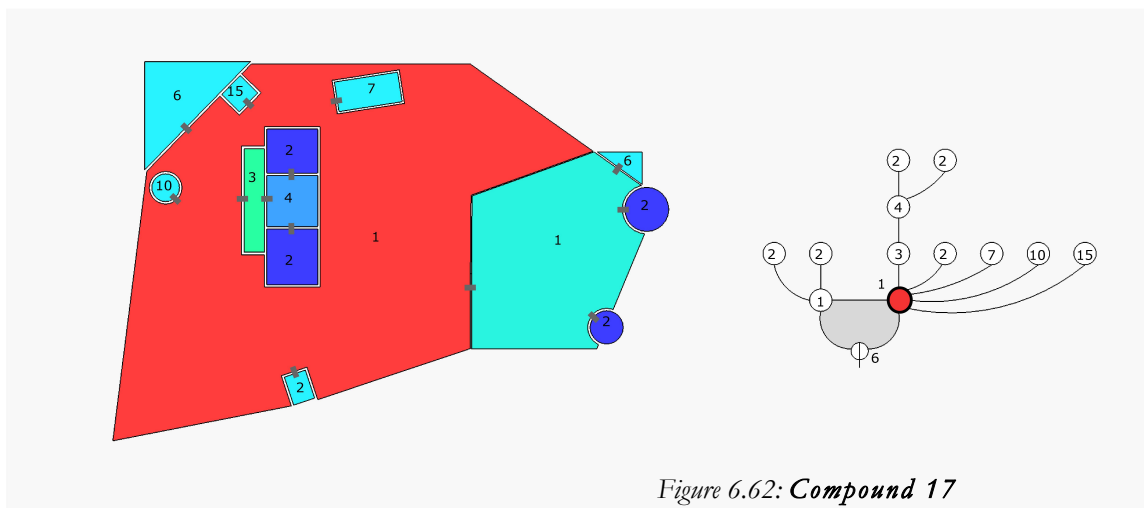
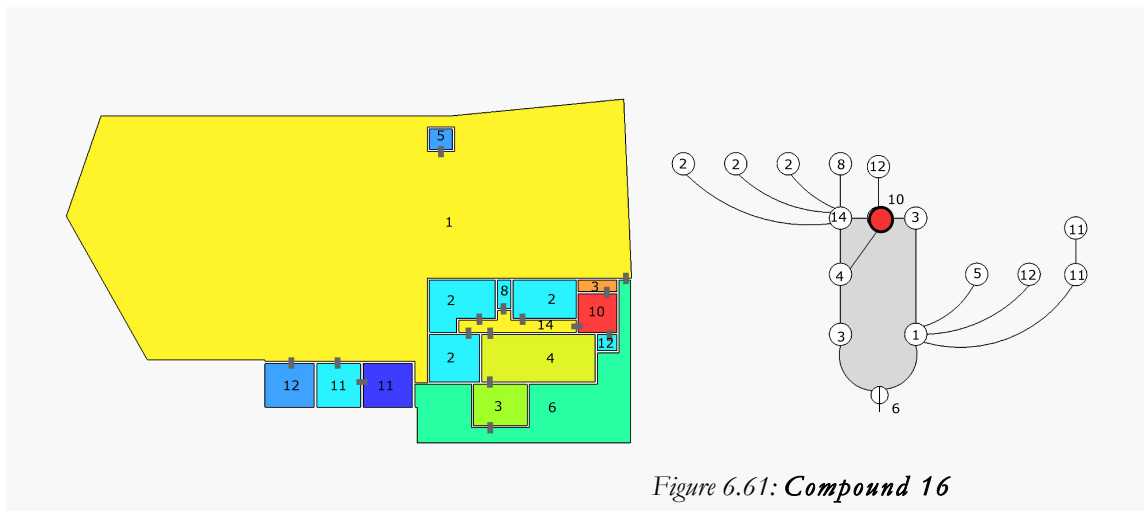
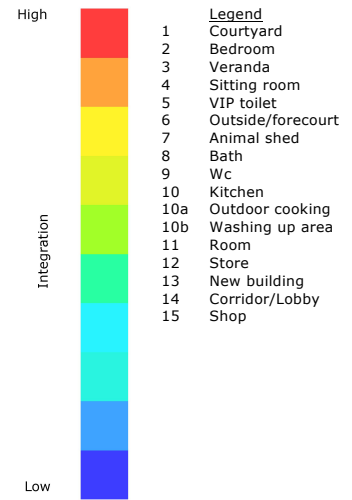
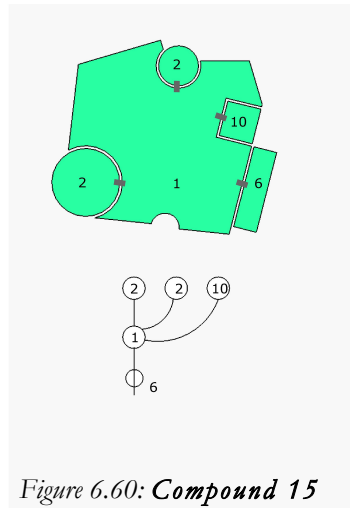
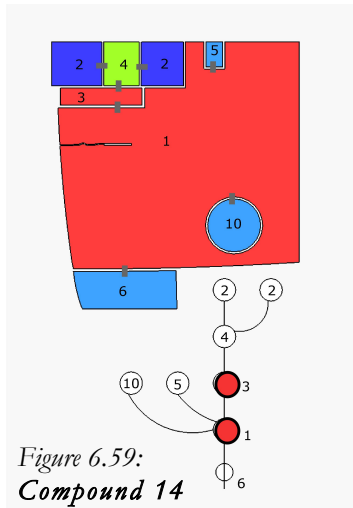
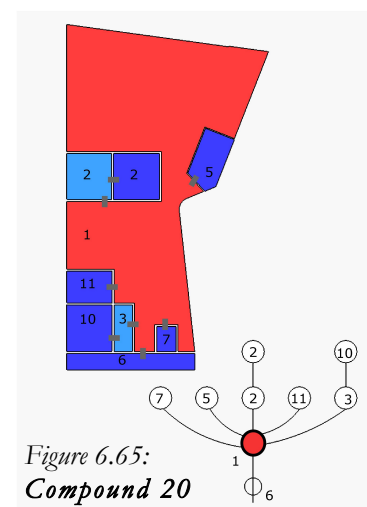
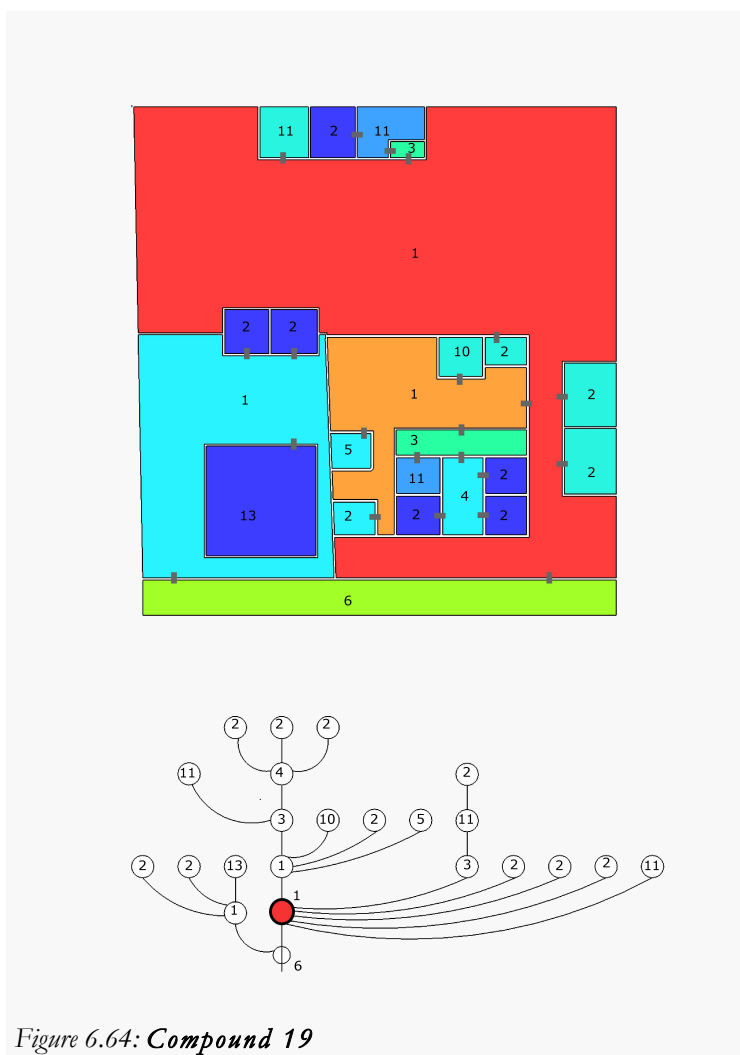
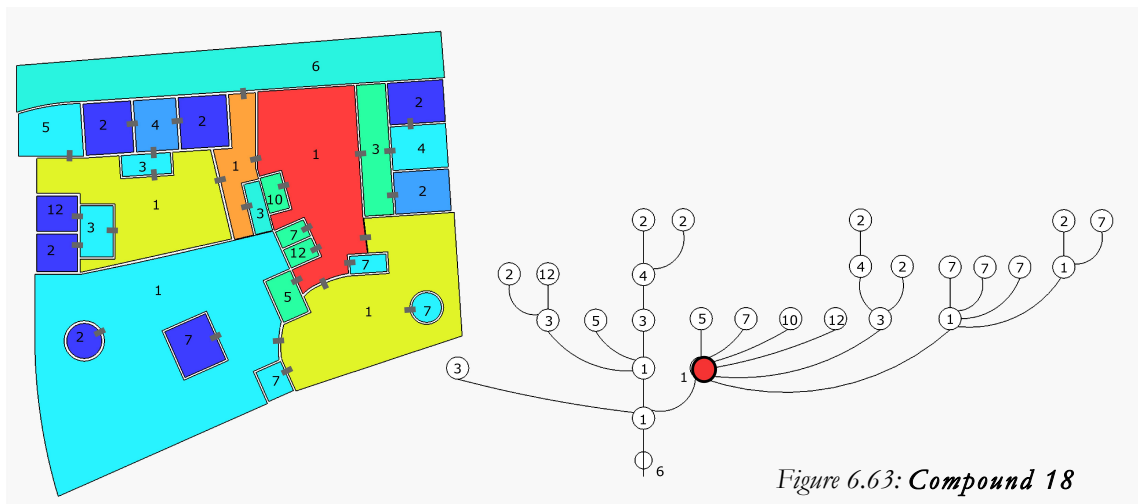


Figure 6.58: **Compound 13**







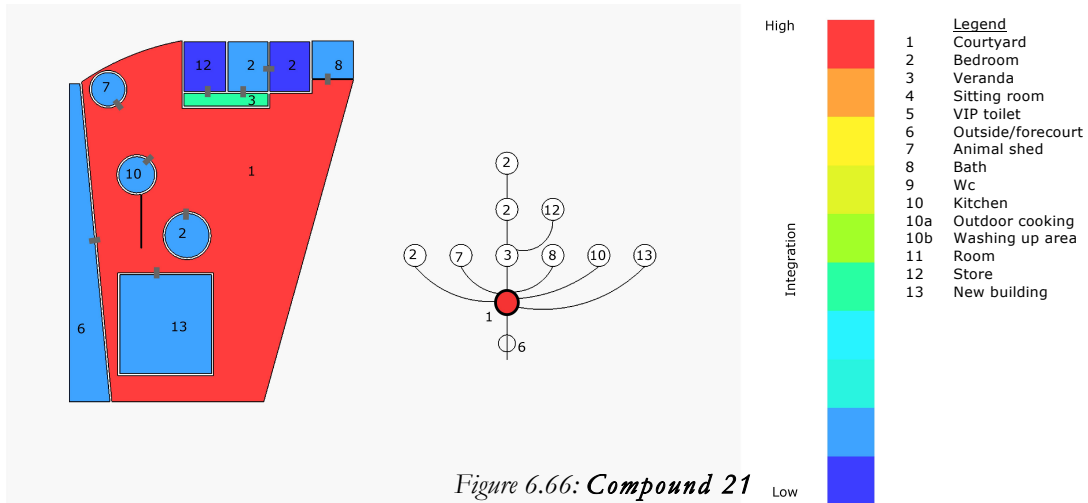


Figure 6.66: Compound 21

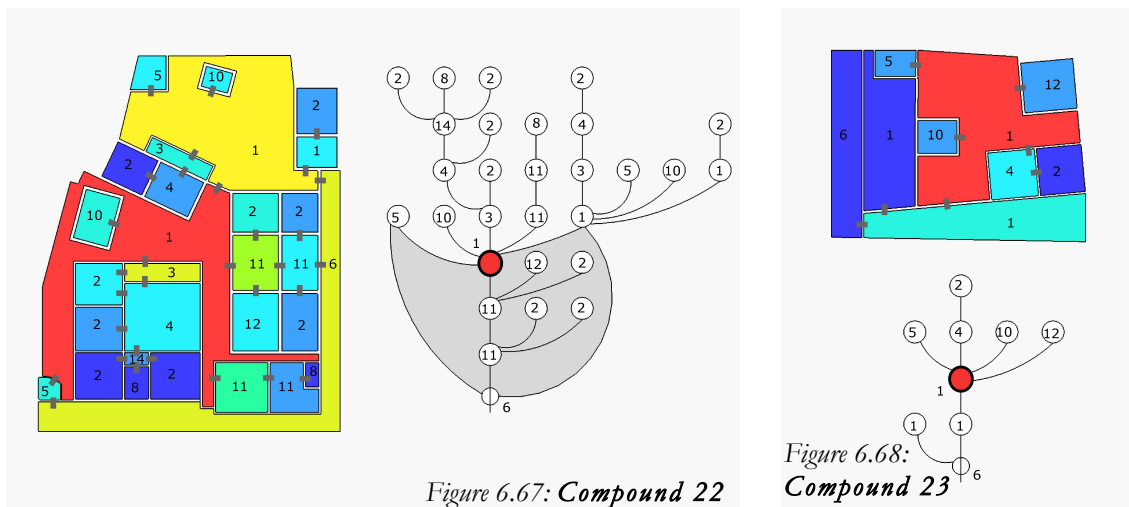


Figure 6.67: Compound 22

Figure 6.68: Compound 23

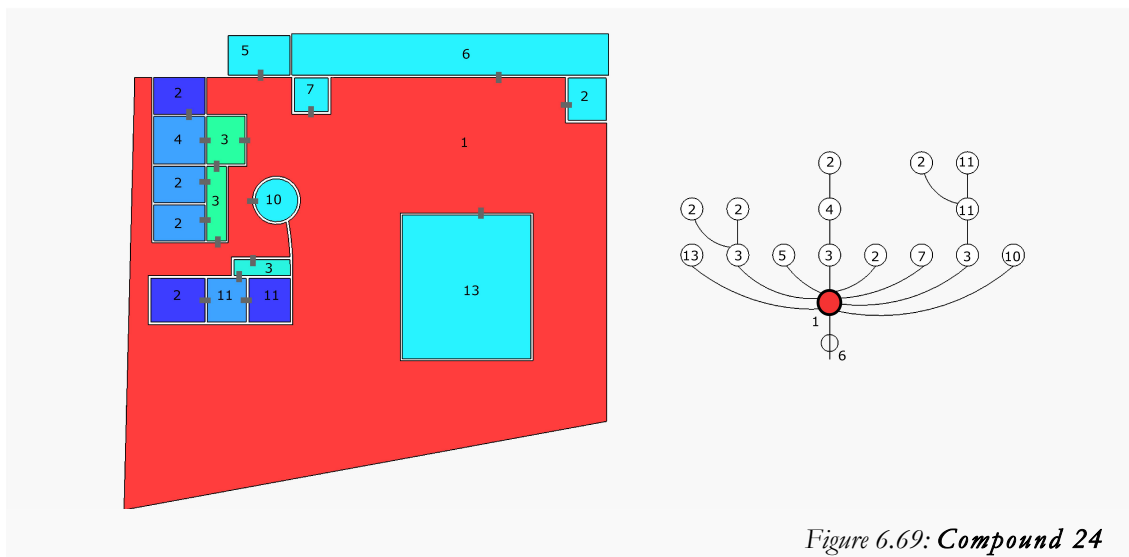
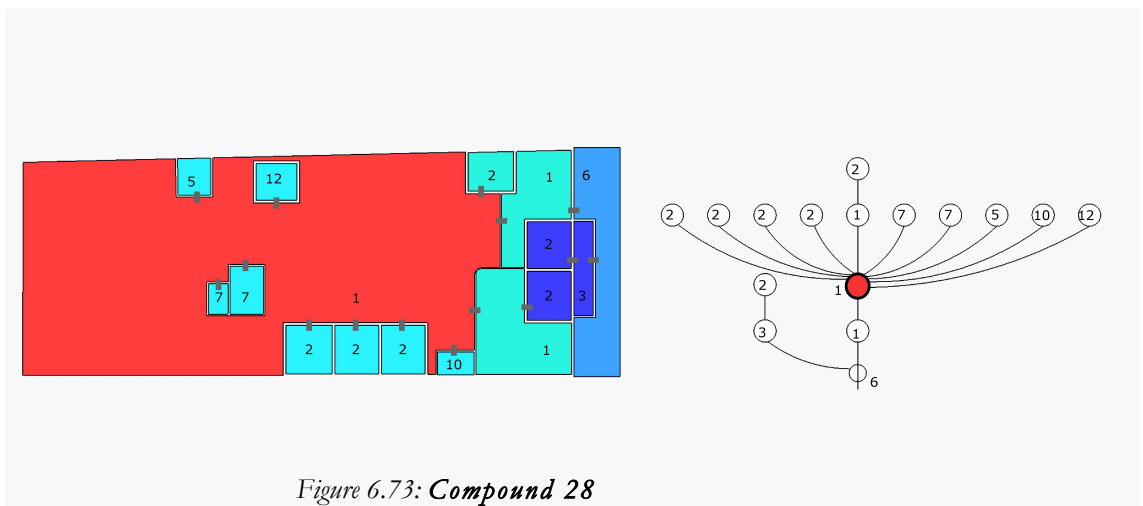
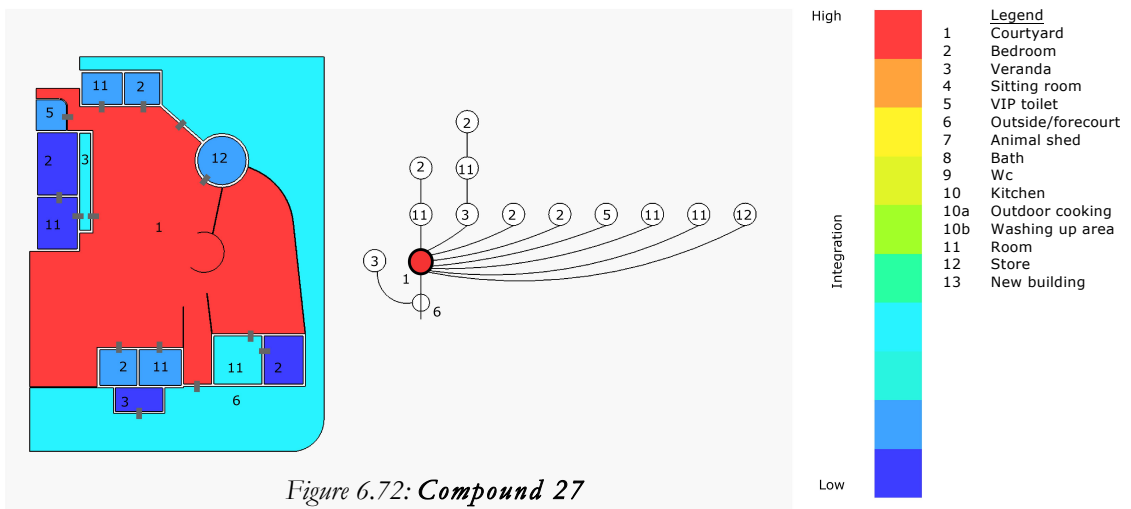
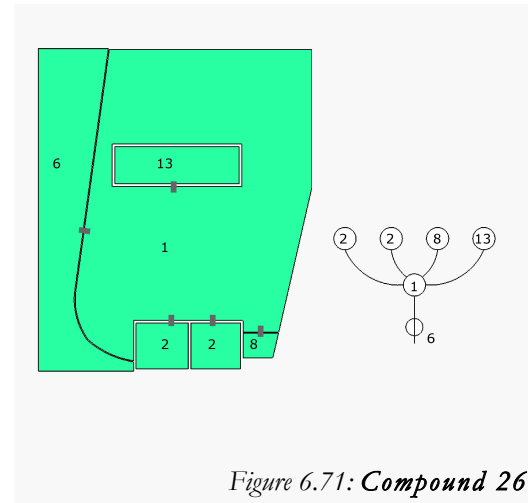
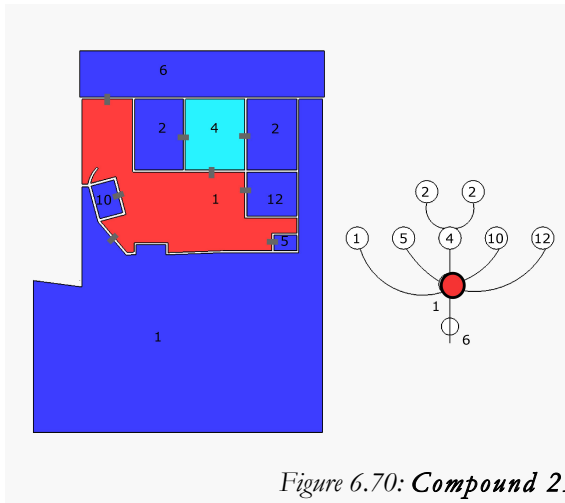
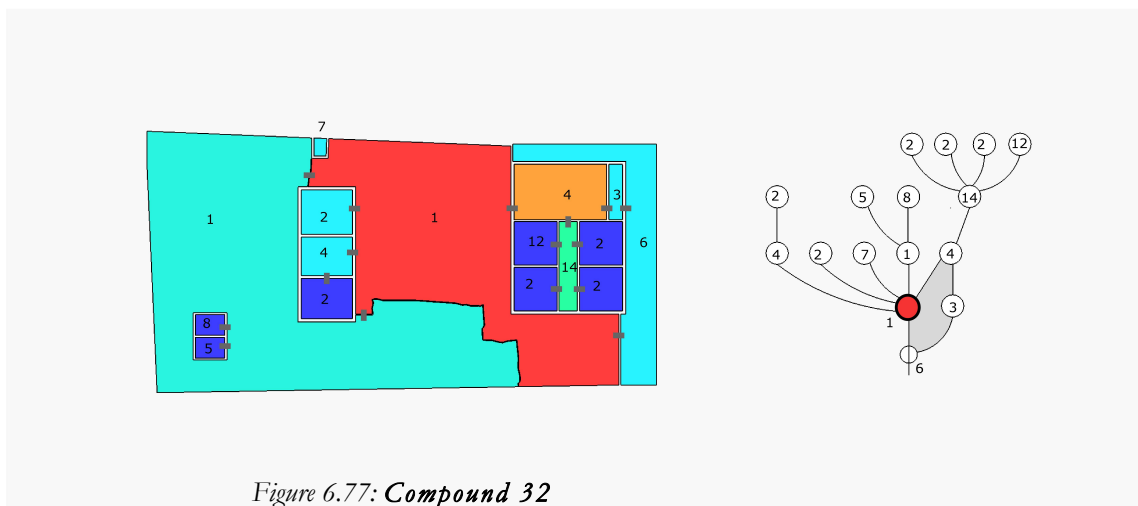
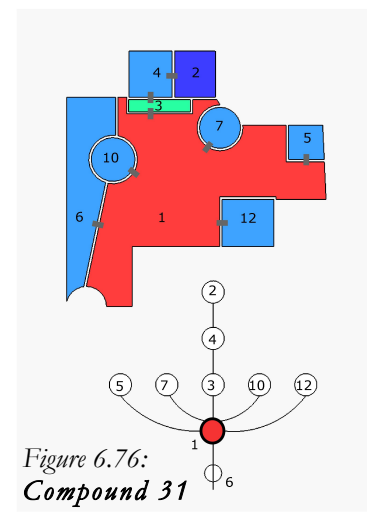
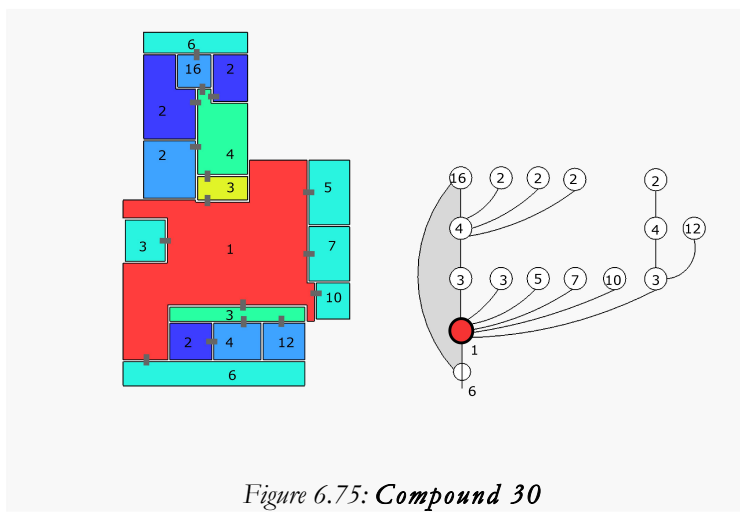
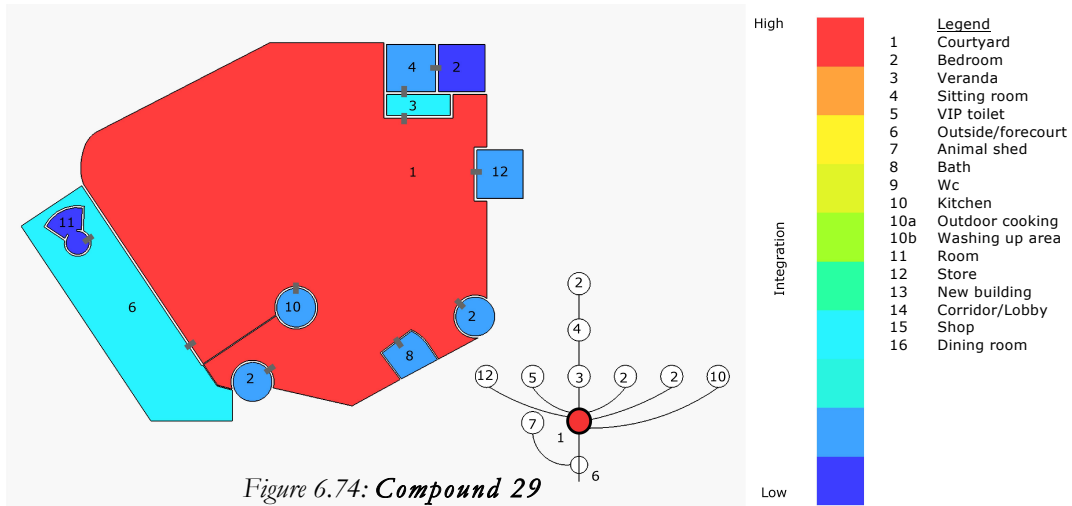
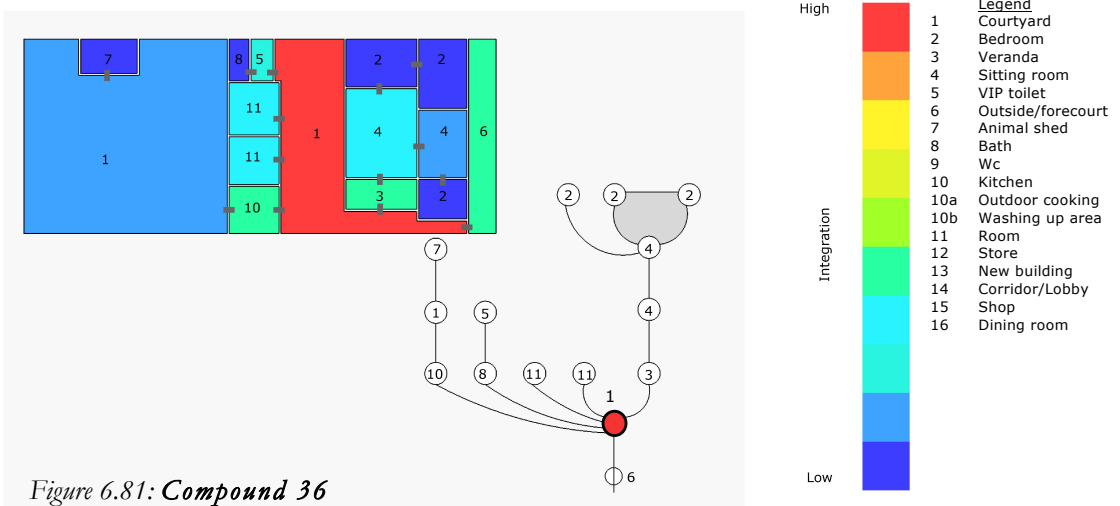
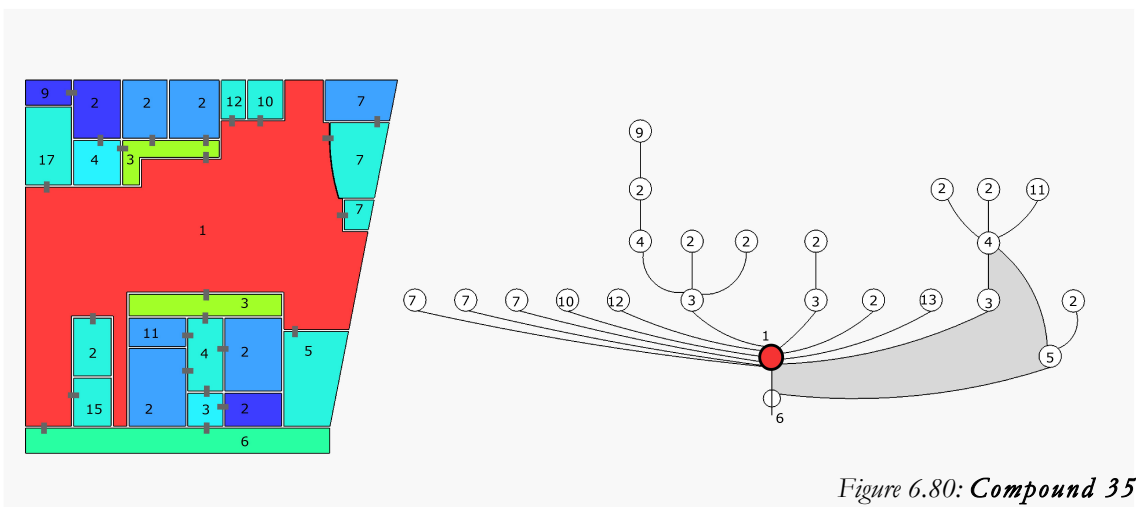
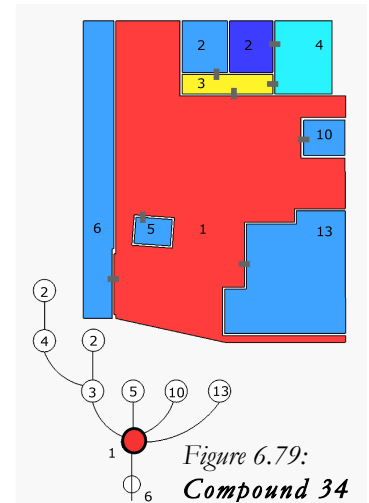
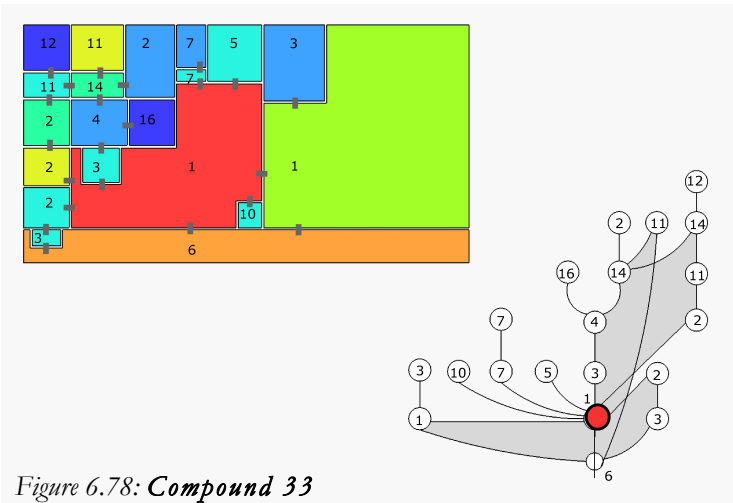
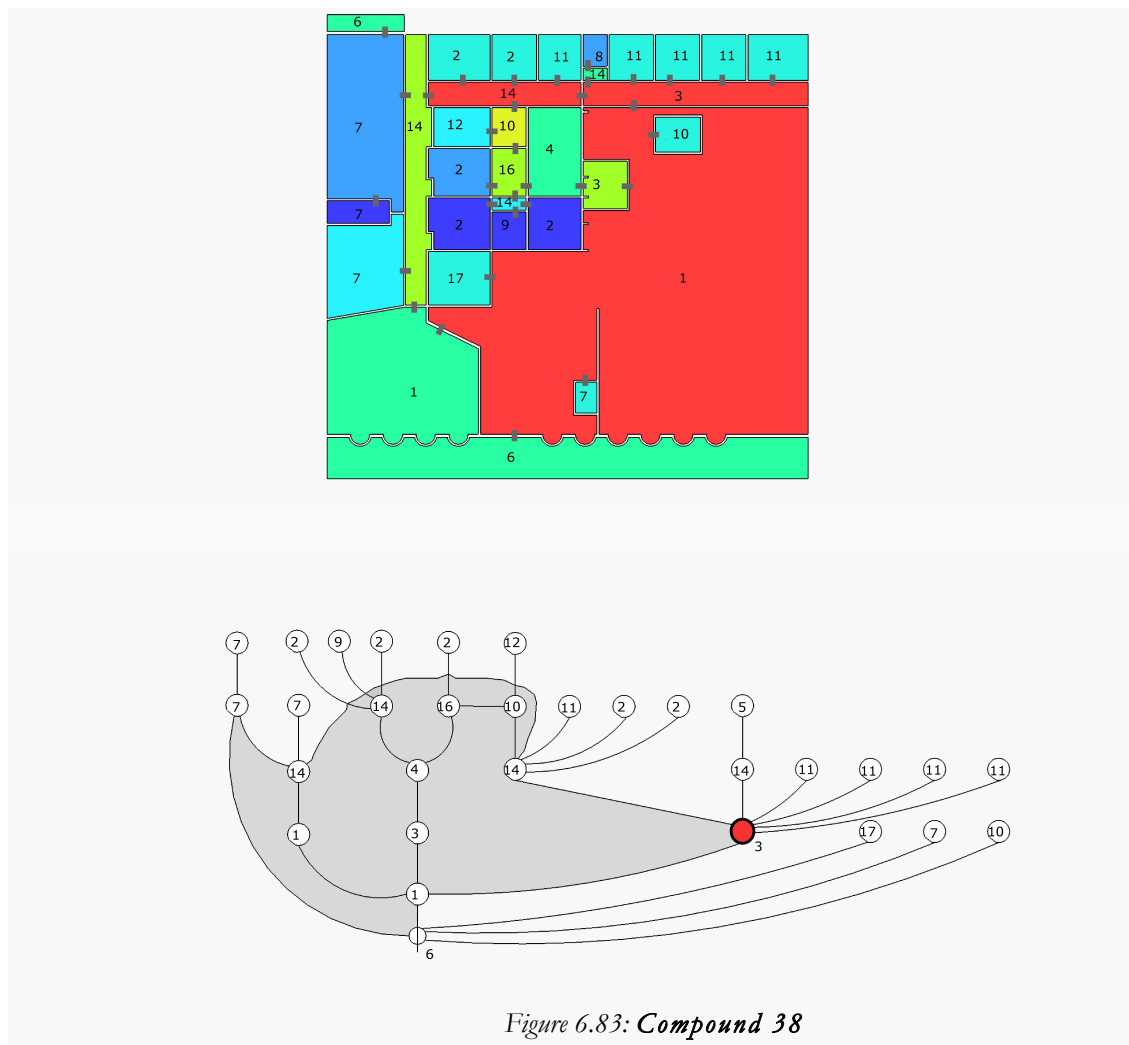
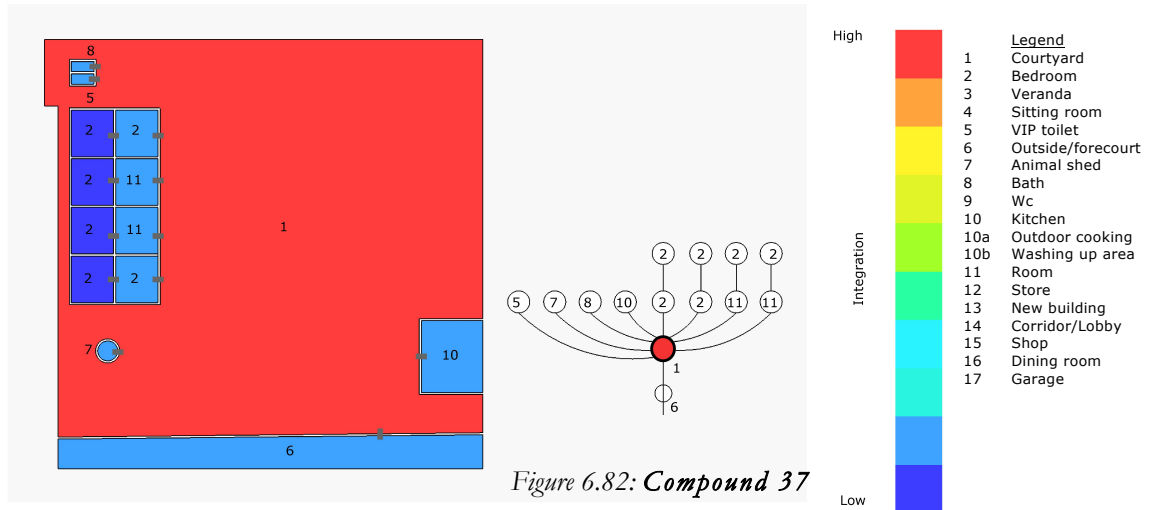


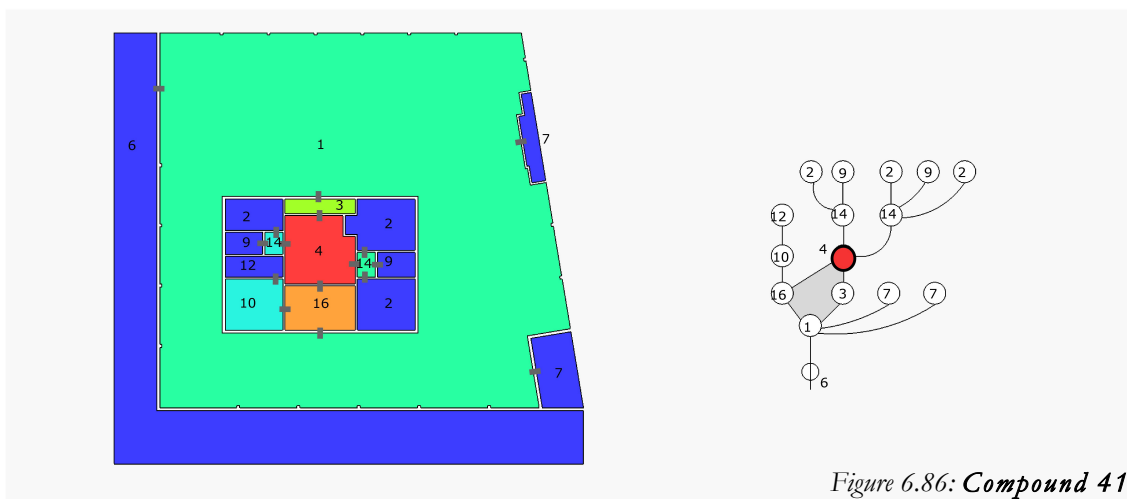
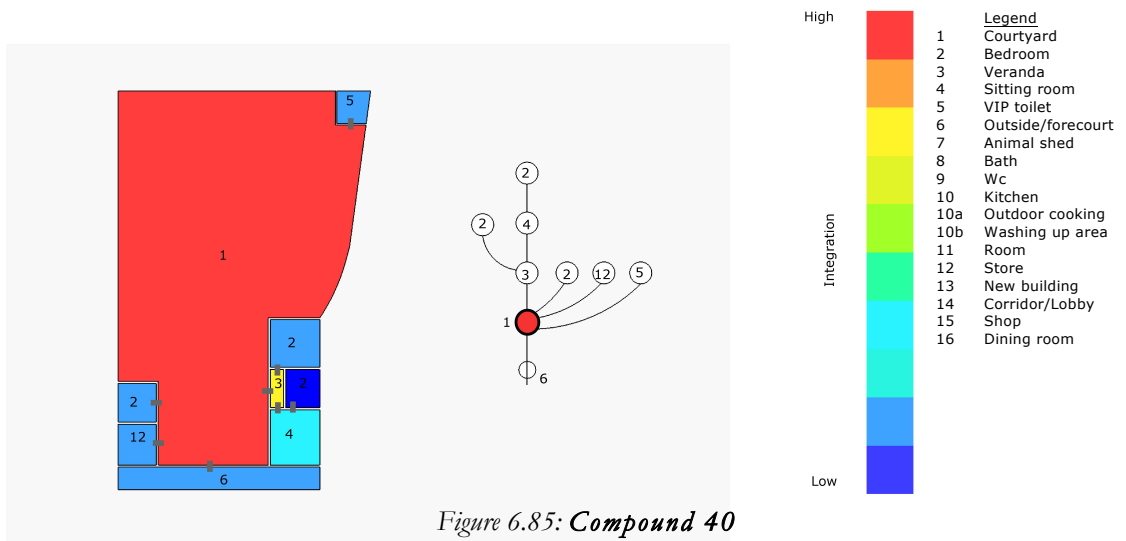
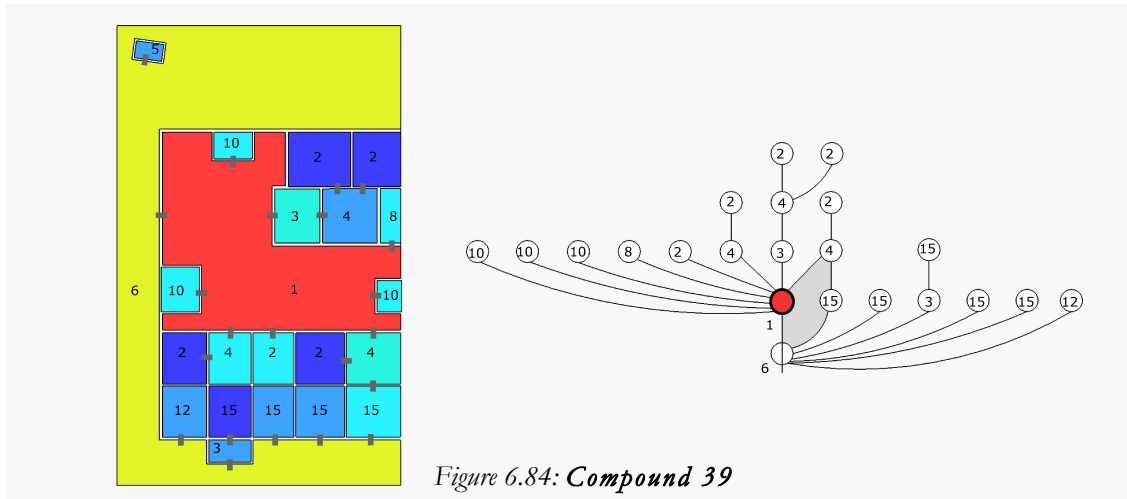
Figure 6.69: Compound 24

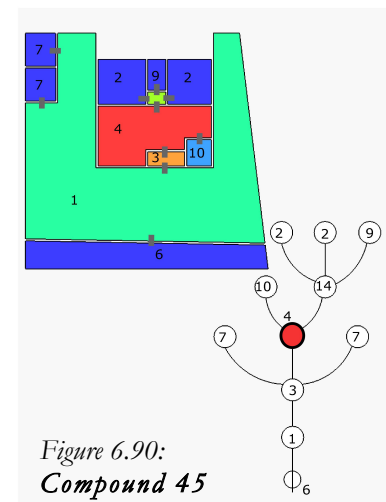
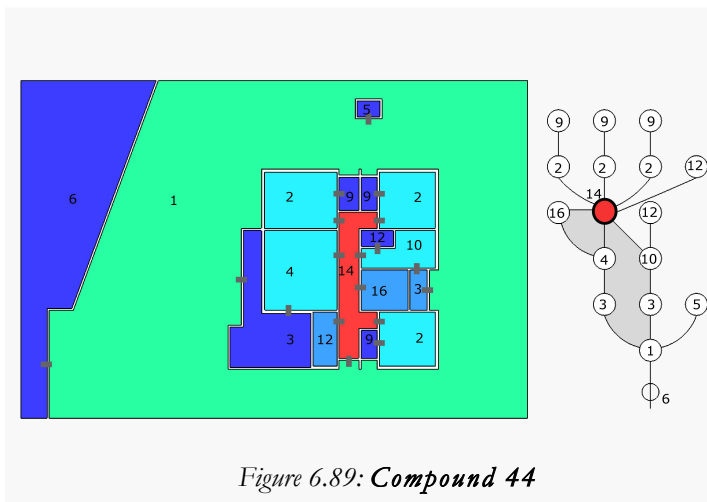
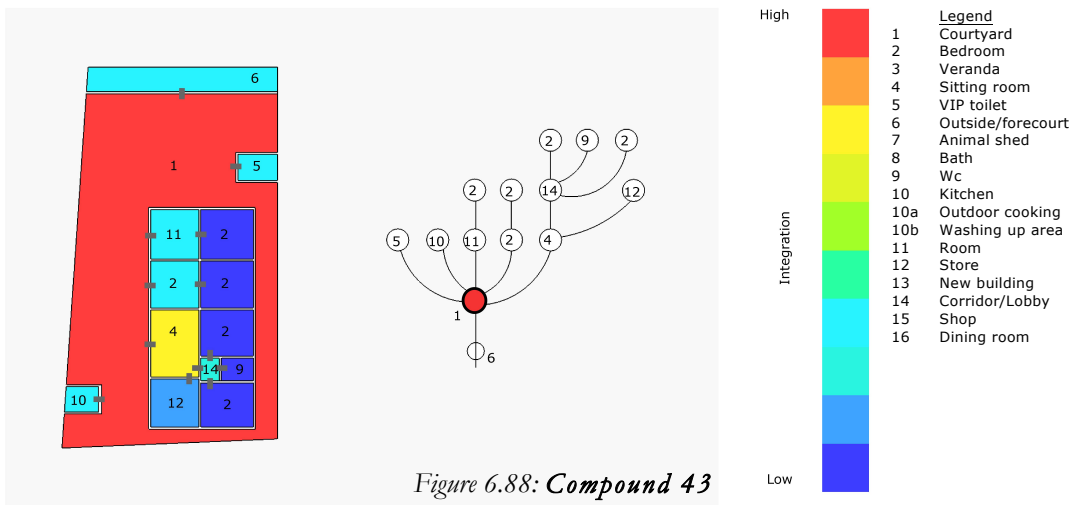
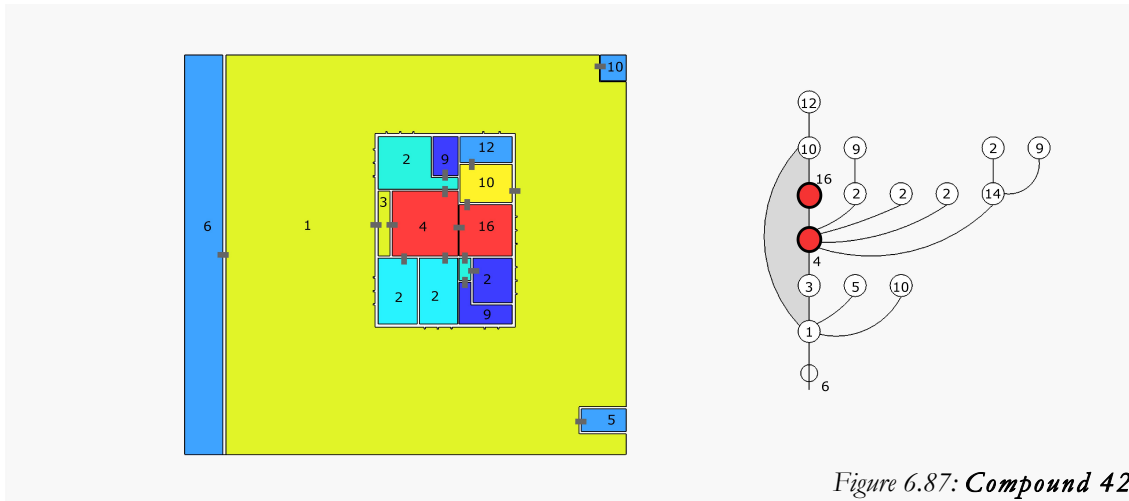








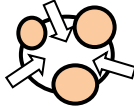

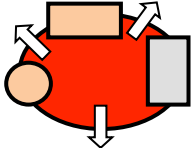
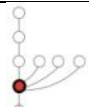
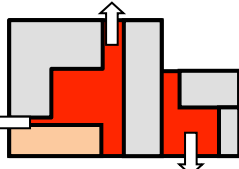
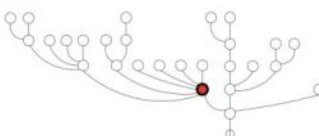
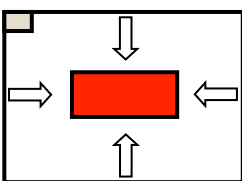
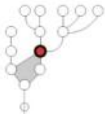




6.4 Compound transformations

Compounds deviating from the courtyard as most integrated space generally correlate with nuclear family set-ups. Four compound transformation patterns were observed from measured floor plans, convex maps and JPGs, illustrated in Table 6.4.

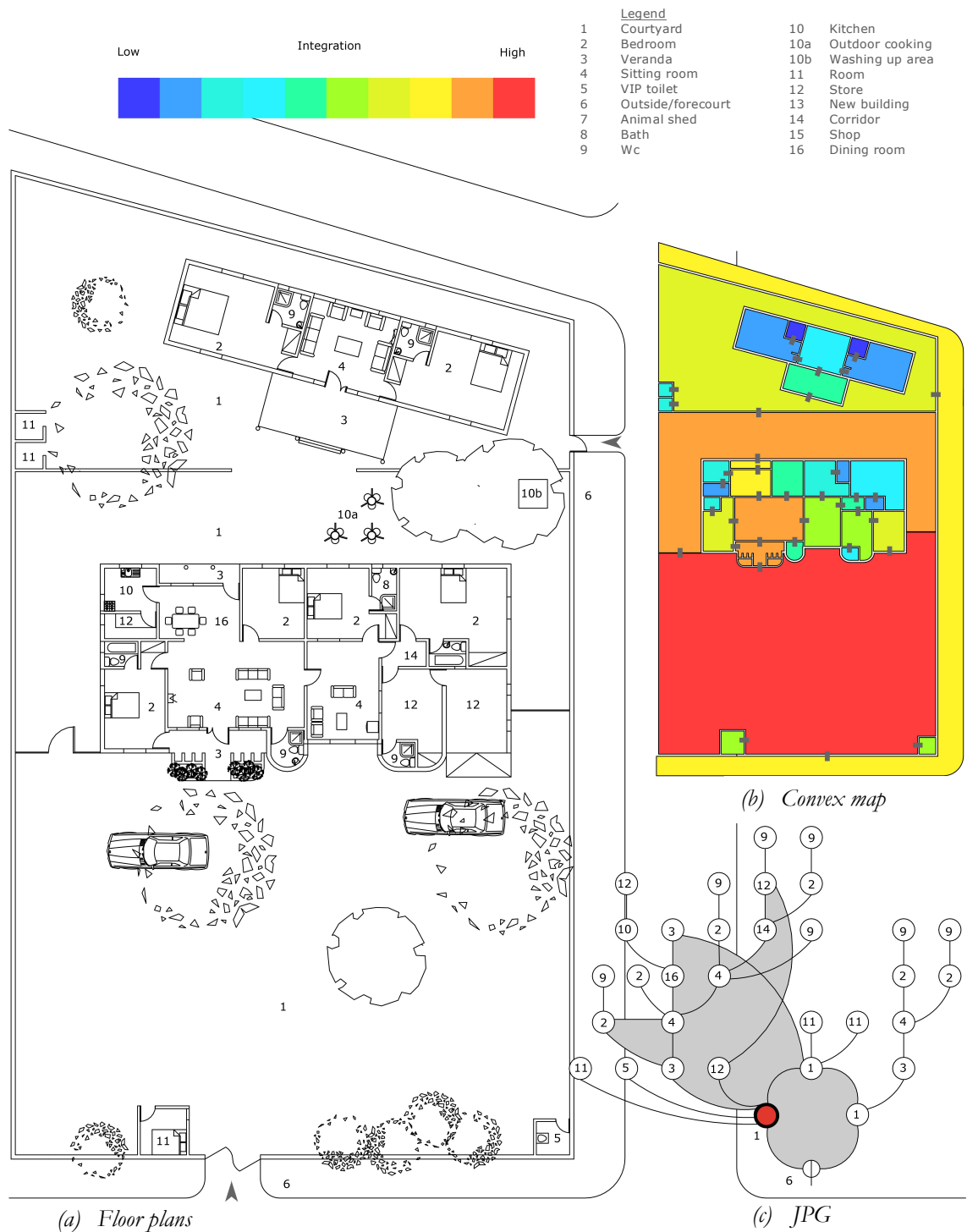
Table 6.4: *Compound transformations and spatial character*

Stage	Characteristics/family type	Compound form	JPG-Spatial character	Ex.#
1	Small inward looking compound for a small, starter or nuclear family in rural areas. Spatial configuration reveals no value for many or sometimes, all spaces		 Small courtyards, few basic spaces, no separation of gender zones/activities	1,15, 26
2	Larger compound (in red, highest IVs) accommodates growing family, usually extended in nature		 Expanding courtyard, little or no segregation of activities	2,3,5,6,7,9,12,14,16,17,20,31,32,36
3	Complex, dense compound at mature, explosive stage; could support composite families, presence of multiple courtyards subdivided into narrow internal streets. Spatially, they typically have a large number of k-spaces		 Gradual segregation of courtyard activities due to multiple family and gender use	4,8,10,11,13,18,19,21-24,30,35,38,39
4	Single bungalow with supporting outbuildings for services, usually accommodates a nuclear family in urban areas. Growth is limited within the fenced plot. Most integrating space not the open courtyard, but a space within the bungalow		 Structure is used to segregate gender related spaces/functions with female related activities towards the back or sides while male related functions are placed near the front of compounds	41,42,44,45

It can be inferred from this finding that as families grow and more structures are added to compounds, highest IVs are likely to shift from interior spaces like sitting rooms or corridors in the bungalow typology into open courtyards (Figure 6.91)⁸⁹. Further studies over a larger sample will help in establishing this trend across the community.

⁸⁹ The interchangeable use of courtyards and interior areas as living spaces is practiced in other Nigerian communities (Ibadan) and parts of the world (Kwakiutl and Puerto Rico) as reported in Rapoport (2007:67)

Figure 6.91: Compound 46, future trends



6.5 Constancy and change in factors influencing house form and residential structure

Results from interview responses and physical measurements in the study area reveal that throughout the identified compound and housing transformations, matters relating location and access to compounds have basically remained constant. This is also true of the use of basic spaces within compounds and housing units. These are related to the socio-cultural factors of kinship, social network, security, basic needs as well as gender roles in the community. On the other hand, boundaries, spatial organization, plan shape, types of spaces, style and appearance of spaces have undergone significant changes over time. This group is largely driven by economic influences.

6.5.1 Location of compounds

Ethnographic accounts of the Tangale community reveal that compounds were organized in tightly clustered family units based on patrilineal kinship from traditional times. This was necessary in part for marshaling communal labor and for security during periods of frequent inters tribal wars. This worldview and lifestyle, which fostered social network among kinsmen, found expression in urban and rural settlements even when the community relocated northwards from the hills in 1948. 95.5% of the surveyed compounds were located within occupied clan lands⁹⁰. 77% of compound heads and 58% of their spouses also listed insecurity related reasons for the least liked wards in the study area to locate a compound⁹¹. Although 33% of compound heads prefer to live away from relatives, 66.7% of compounds maintain at least 1 relative as a neighbor⁹².

⁹⁰ Figure 6.92

⁹¹ Figure 6.93

⁹² Figure 6.94

Figure 6.92: Kinship, location of compound and its relationship to the community

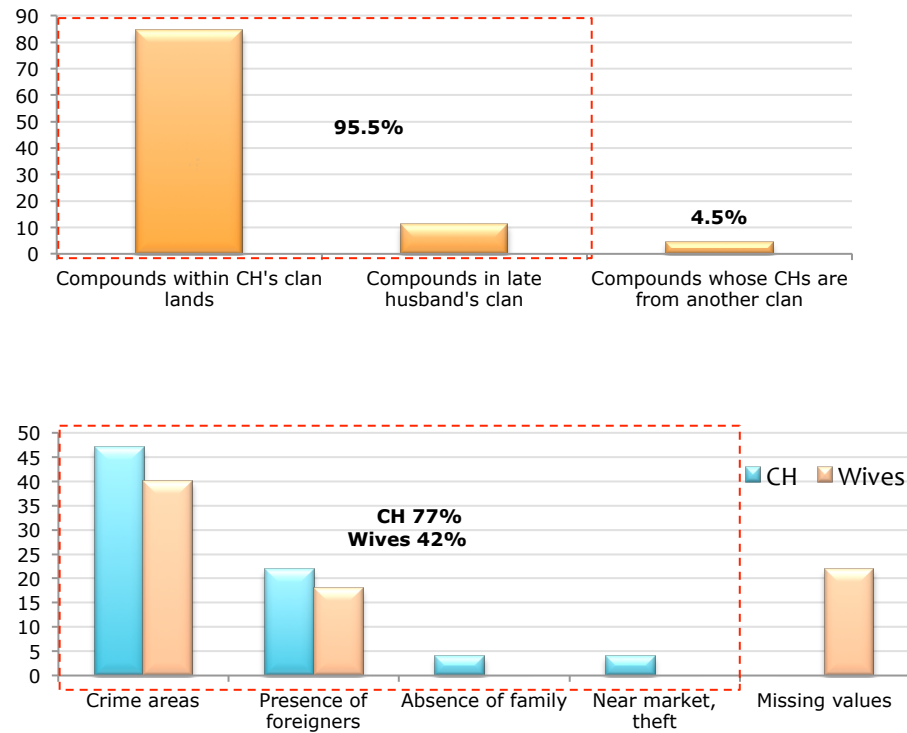
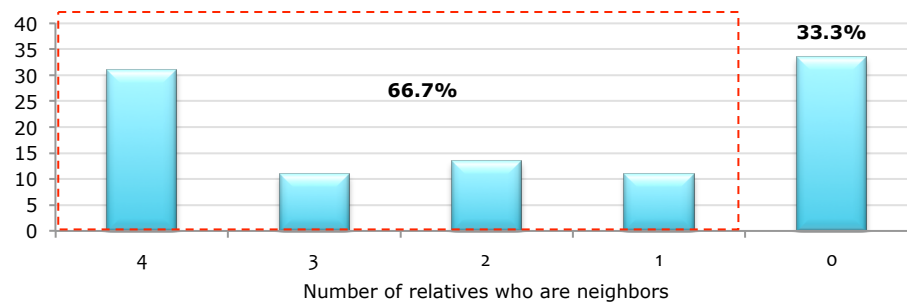


Figure 6.93: Insecurity related reasons for least preferred areas to locate compounds

Figure 6.94: Neighbourliness, kinship and social relations



6.5.2 Access to compounds

Closely related to location is the need for security. Traditionally, Tangale hill settlements were not walled. Single entrances to compounds however faced a central communal area or forecourt where extended family activities took place. Thus men seated within communal forecourts could survey multiple entrances simultaneously (Figure 5.10). With the relocation of

the community and construction of roads after independence, entrances to compounds frequently face streets, in full view of the public in accordance to this tradition. This has basically remained unchanged. Not surprisingly, the measured survey revealed that 77.7% of compounds are accessed via single entrances in this manner. Compounds with multiple entrances frequently contain more than one courtyard. These account for 23.3% of the sample. Such compounds were found to frequently accommodate composite families living within separate but linked courtyards⁹³. Most compounds within the latest freestanding bungalow typology had single entrances accessed via adjoining streets.

6.5.3 Compound boundaries

Walls constructed of cornstalk, woven grass or mud delineated the boundaries of compounds in traditional times⁹⁴. The extents of such walls frequently depended on the sizes of huts and the open courtyard within inherited farms bordered by other farms belonging to kinsmen. Consequently, borders to farms and plots were known by all and sundry within the settlement as crops and vegetables were frequently cultivated in the farmlands surrounding compounds. With the gradual weakening of social network especially in urban towns, compound walls have frequently come to enclose entire plots with vegetable patches cultivated within walled but open courtyards⁹⁵. Many of such compounds are constructed on plots purchased from their original owners. Enclosing entire plots establishes territoriality and prevents land encroachment by neighbors who are frequently not kinsmen, unlike obtains in traditional times.

⁹³ See *Figures 6.8, 19, 22, 27 and 33*.

⁹⁴ See *Figures 6.1*

⁹⁵ See *Figures 6.19, 22, 24, 25, 28, 30, 35-45*.

6.5.4 Spatial organization

Partly owing to the explanation proffered above, spatial organization has changed over the course of compound transformations in the study area. In traditional times, huts and rooms were arranged around the perimeters of open courtyards. This was sustained through the first set of compound transformations. With the introduction of rectilinear houses in the second and third housing typology, compounds began to be divided into segments often with multiple courtyards⁹⁶. A complete change occurred in the last stage of compound and housing transformations with freestanding self contained bungalows built entirely within enclosed courtyards. The central location of the bungalow splits courtyards into front and back yards, with the back yard accessed via sides of the open courtyard⁹⁷. Service spaces such as ventilated improved pit latrines and storage rooms are often constructed at the sides of bungalows within walled courtyards.

6.5.5 Plan shape

The measured survey reveals that the shape of housing units has changed from predominantly circular huts to rectangular rooms. This in part is influenced by the introduction of rectangular buildings into the community via colonial masters and Christian missionaries. Western lifestyles experienced by many civil servants in government provided houses introduced to the community often included the use of rectilinear standardized furniture (Saad, 1991). Furthermore, the use of modular concrete and cement blocks for the construction of buildings also encouraged this trend. Presently, it is becoming rare to find a compound entirely made up of circular huts or structures⁹⁸.

⁹⁶ Refer to *Figures 6.8, 17, 18, 19, 22, 25, 32, 33, 36* and *38*.

⁹⁷ See *Figures 6.41-44*.

⁹⁸ *Figure 6.1*

6.5.6 Types of spaces

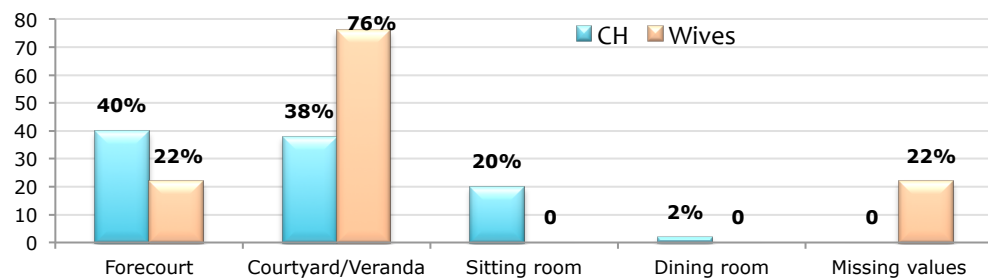
One of the effects of housing transformations in the study area was the introduction of function specific spaces atypical within compounds prior to external influences. Traditionally, Tangale compounds comprised basic spaces such as sleeping and cooking huts, granaries, animal pens and an open bath all arranged around a central courtyard. Colonial masters and Christian missionaries introduced sitting rooms, toilets and verandas. These spaces found expression in the second and third housing typologies of rectilinear rooms and houses. The complete adoption of western style self contained bungalows introduced carports, garages and dining rooms to support the westernized lifestyle of a number of residents within the community. These are frequently retired or returnee civil servants who had lived in government provided houses in urban towns of Nigeria. Consequently, compounds surveyed displayed various types of spaces in line with cultural transformation patterns.

6.5.7 Use of space

In contrast to changes noted for types of spaces within compounds in the study area, the basic use of space has remained consistent as revealed by interview responses and observations on functions, activities and use of space. Open courtyards were traditionally used for basic household activities such as food preparation and cooking, washing up, eating, receiving guests as well as resting. These are activities traditionally associated with the female gender. Men spent most of the day on the farm. They would rest thereafter with friends and kinsmen in communal meeting places and forecourts under the cool shade of designated trees. In contemporary times, many household activities carried out by women were observed within open

courtyards and verandas⁹⁹. The latter serve as covered extensions to the courtyards. Consequently, courtyards and verandas are the most used spaces for 76% of female respondents. 38% of compound heads are sometimes involved in activities within courtyards. These include functions related to animal husbandry and routine maintenance of walls and housing units. 40% of compound heads and 22% of their spouses also received guests within forecourts in front of compound entrances. I conducted most of the interviews with CHs within these spaces. Relatively fewer interviews took place in sitting rooms within bungalows in the latest typology.

Figure 6.95: Basic needs, gender roles and use of space



6.5.8 Style/appearance of spaces

Owing to changes in material and construction technology, the style and appearance of spaces within compounds have changed from mud walls and floors to concrete and ceramic finished surfaces over time. The strong preference for concrete structures and finishes from interview respondents however suggests that this trend is likely to continue into the foreseeable future due to social status and ease in maintenance. 80% of compound heads and 66% of their spouses preferred constructing a new concrete self-contained bungalow, replacing compound walls with concrete structures or applying new concrete or ceramic finishes to walls and floors of existing housing units when funds were available in a low income community (Figure

⁹⁹ 57% of all household activities were observed within courtyards and verandas (Maina, 2012c)

6.97). These were preferred over maintenance related activities. Not surprisingly, 84% of surveyed compounds contained spaces constructed in concrete and finished with cement or ceramic tiles¹⁰⁰. Furthermore, five female compound heads in the survey, who were all widows supporting growing families in a male dominated community, had their compounds built completely or in part with concrete. The constants and changes discussed in the foregoing section are summarized in Table 6.5.

Figure 6.96: Social status related preferences from surveyed compounds

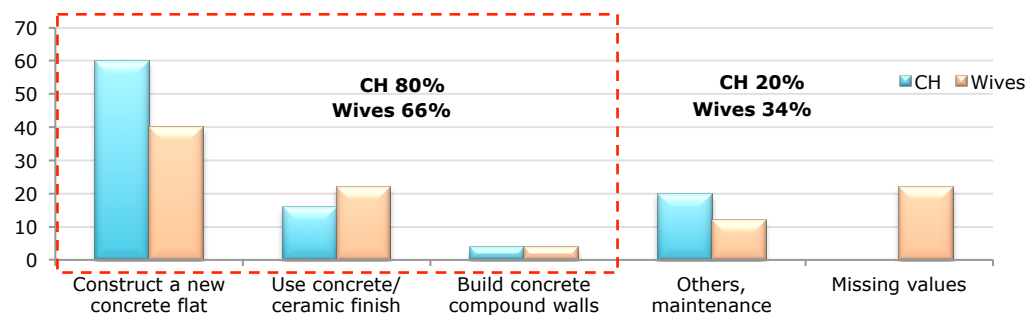
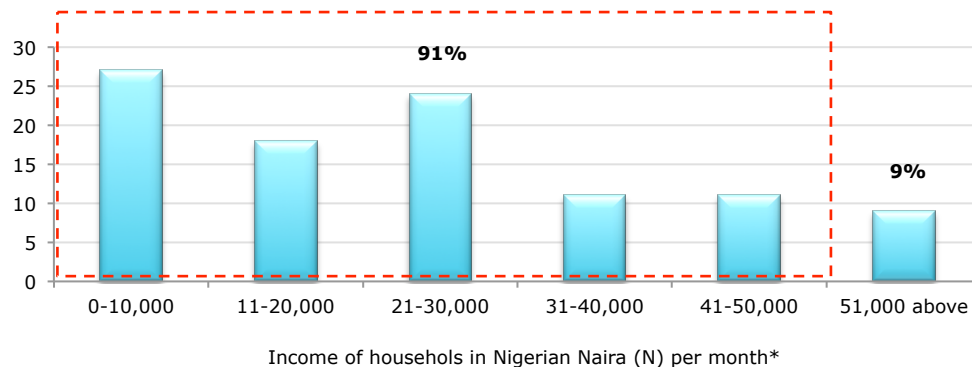


Figure 6.97: Income of households



*The poverty threshold was obtained using the average population per compound = $8.3 \times \$1.25 \times 30 \text{ days} = \311.25 . Using a conversion rate of $N1 = \$0.006352$ according to exchange rates in December 2012, the poverty threshold = N49,000. This means about 91% of surveyed households live below the UN poverty line (UN 2011:9). This tallies with economic projections that more than 70% of the population of Nigeria especially in the North East region live below the poverty line (Awom 2012, Utomi 2012). This finding lends credibility to the survey data.

Table 6.5: *Summary of constants and changes in factors influencing house form and residential structure*

Variables	Traditional form 1 st stage/ typology	Transformation 2 nd stage/ typology	3 rd stage/ typology	4 th stage/ typology	Constant	Changed
1. Location of compounds	Within clan lands	-----	-----	-----		
2. Access to compounds	Single access	-----	Sometimes, 2 nd entrances for multiple courtyards	-----		
3. Boundary	Courtyard extents		Entire plots			
4. Spatial organization	Huts/rooms arranged around the perimeter of courtyards	-----	Rooms often merged into 1 house with service spaces arranged around the courtyard	Centrally placed bungalows splits courtyards into front, back and side yards		
5. Plan shape of housing units	Circular huts/ granaries	Circular huts and rectilinear rooms	Rectilinear houses	Rectilinear bungalows		
6. Types of spaces	Basic spaces for sleeping, cooking, services, courtyard, forecourt	Introduction of verandas, sitting rooms, toilets	Introduction of ventilated improved pit latrines, separate from baths	Introduction of garages, carports and dining rooms in self contained bungalows		
7. Use of spaces	Females- courtyards/ verandas, Men- forecourt and courtyards	-----	-----	-----		
8. Style/ appearance	Mud finishes	Mud and concrete/ cement finishes	Concrete finishes	-----	Emerging trend	

6.6 Socio-cultural factors influencing vernacular house form and residential structure in the study area

6.6.1 Kinship and security in the location and access to compounds

Results from the measured survey reveal that kinship remains the strongest socio-cultural factor for determining the location of a compound in the study area. In pre-colonial times on the Tangale hills, settlements comprised clustered compounds organized in family and kin groups. This arrangement was advantageous for marshaling communal labor and for security. Communal labor was utilized for building projects, strictly considered a male affair. This served as a means of transferring skills and knowledge to young boys within the community. Communal living was also advantageous for marshaling labor for farm work. This was the main occupation of the people, which has been sustained in contemporary times. Although many men are employed as civil servants and businessmen, in

reality all interviewed male compound heads still practice farming. Most farms are inherited and passed on from one generation to another. Consequently, adherence to such practice ensures that kinship will continue to play a large role in the daily activities and lifestyle of residents in the community.

Locating residential areas within occupied communal lands was advantageous for security during an era of inter tribal clashes. Colonial administration played a vital role in eradicating this menace from 1900 when the British ruled Nigeria (Colonial Nigeria, 2013). Insecurity has however become a pressing national issue in recent times especially in the North Eastern part of the country as the region recorded an unprecedented rise in insecurity and insurgency within the last two years (Awom 2012, Herskovist 2012). In light of the present situation, consideration should be paid established cultural values, which foster security for local communities in the future planning of residential areas. Additionally, many surveyed compounds are accessed via single entrances, which usually face open areas, footpaths or streets for surveillance and security. This factor, to a large extent, determines the orientation of compound entrances in the community from pre-colonial times to present day. Together, these findings underscore the vital role kinship and security play in settlement planning and urban layout in the study area.

6.6.2 Basic needs and gender roles in the use of space

Observations and interview responses regarding space use within surveyed compounds reveal that the dominant use of courtyards by women has remained constant over time. This is largely because activities relating to the female gender such as food preparation, cooking and washing up still occur within the confines of open courtyards as in pre-colonial times. In fact, all surveyed compounds had at least one outdoor cooking hearth and

washing up area within the open courtyard. This practice is what has largely ensured activities within traditional cooking huts and contemporary kitchens remain virtually the same. These spaces are put into use during the rainy season from April to September when outdoor cooking is not always feasible or practical. Consequently, the kitchen is the least transformed space in terms of space use. In contrast, other function specific spaces introduced into the community over time such as sitting rooms, dining rooms and garages are often utilized for other activities such as sleeping, receiving guests and storage purposes respectively. The open courtyard, being the most multi-functional of domestic spaces is thus the most physically transformed space largely because it supports many activities, including male gender related functions. These functions involve animal husbandry and the necessary maintenance of buildings and structures constructed within courtyards. This has also been consistent as revealed by interview responses.

6.6.3 Social status in the style/appearance of spaces, housing units and compound walls

The strong preference for concrete construction and finishes in a low-income community suggests the emergence of social status as a socio-cultural factor influencing house form and residential structure in the study area. Concrete construction in the community is advantageous in two notable ways. Firstly, it is easier to maintain concrete surfaces and walls over time compared to mud structures and finishes. Many women I interviewed confirmed that it was much easier keeping cement-plastered surfaces clean than compacted earth floors within housing units and courtyards. Additionally, men noted that concrete structures were durable, lasting many decades in contrast to mud structures, which need to be maintained regularly. Concrete structures are however more expensive to

finance compared to mud huts and compound walls constructed of cornstalk. Consequently, CHs that owned such structures are accorded a high social status in the community. Secondly and because of the reason proffered above, concrete self-contained bungalows in the latest typology have come to acquire an elitist status. Many compound heads strive to be able to own such structures in time as revealed by interview responses. For similar reasons, all female compound heads in the sample owned a house built in part or whole with concrete. In other words, one can predict the typology of a house if its compound head is female¹⁰¹. The reason is not far fetched. A female compound head in a male dominated community would need the physical and psychological advantages a concrete structure can afford. These women frequently utilized funds accruing from their late husbands' gratuities to construct such housing units and erect enclosing compound walls despite having to raise families in frequently difficult circumstances.

6.7 Conclusions

In conclusion, findings from the measured survey have been instrumental in documenting the housing situation within the community. Together with information obtained from the ethnographic survey, these have been useful in identifying housing typologies as well as proffering explanations for compound transformations and socio-cultural factors influencing house form and residential structure in the study area.

¹⁰¹ 3 out of such housing units were in the latest bungalow typology while 1 belonged to the third. The houses and other structures within these compounds were constructed entirely with concrete blocks. The fifth house was in the second typology. This was an old widow who still managed to construct a two-roomed house and part of the compound walls in concrete after the demise of her elderly husband.

6.7.1 Housing typologies: the role of external influences, technology and changing lifestyle in the Tangale community

Findings from this study reveal links between identified housing types and major events in the study area. Initial settlements on the Tangale hills necessitated clustered layouts in part for security in an era of inter tribal wars. Such compounds comprised huts constructed of stone and mud roofed with thatch, which were the available materials on a hilly terrain. These were influenced by rectangular structures constructed by colonials and subsequently missionaries at the turn of the 20th Century, which later found expression in the second and third typologies-rectilinear rooms in mud and concrete. Such compounds comprise the vast majority (73%) of the housing stock in the survey (*Table 6.1*). The latest style of freestanding bungalows within walled courtyards is a direct influence of houses designed according to western standards imported into the community by residents who worked for the government in large cities or urban towns. These findings relating to external influences on traditional housing generally support the theory that domestic built form produced in the community reflects the dynamic nature of its changing lifestyle and culture largely due to external influences. In other words, Tangale architecture, largely residential in nature, is a container of Tangale culture as suggested by the first hypothesis the study.

Results from similar studies in Nigeria (Saad 1991, Ahmed 2007, Mai and Shamsuddin 2007) attest to this idea. Saad, for example, asserts the incursion of money economy, corrugated iron sheets and modern furniture in the traditional setting have “all had an impact on the lifestyle, world outlook and consequently dwelling forms of the people. The current trend is to build a rectangular house . . . once the funds are available” (Saad 1991:268). Ahmed’s study on changing patterns of Hausa domestic

architecture within the walled city of Zaria reports, "the traditional Hausa compound as a house form is rapidly being replaced with contemporary houses whose spatial structures were conceived along Western models. Modern building materials are also substituting traditional ones" (Ahmed 2007:vi). For these communities, architecture plays a passive role by containing, conforming and reflecting changes occurring within the cultural fabric of society.

As commonly observed, transformations are a result of change. This is inevitable. However, most traditional communities in flux maintain certain core values, which are also reflected in their domestic spaces and built environments. Architecture plays an active resistive role in preserving salient aspects of culture in such cases. In Bali for example, transformers "have tried to modernise the traditional buildings while maintaining their core culture" Sueca (2003:ii). In Indonesia, the semi-modern *sao pu'u*, a traditional house form continues to be in use. Although transformed, "the dwelling tradition essentially remains almost the same" (Pandjaitan 2008:364). In Bahrain, a hybrid style of architecture between the old and new has emerged where traditional forms, decorative elements and use of space have been transformed to fit changing lifestyles (Dayaratne, 2008). Changes in rural Indian compounds are such that "spaces within the traditional houses have been transformed from flexible to rigid with defined functions" (Kotharkar and Deshpande 2012:31). For Tangale compounds, cooking huts transformed into kitchens are the least modified spaces as functions carried out within them namely food preparation and storage have not changed. In contrast, courtyards have been the most physically modified spaces in part because they frequently accommodate diurnal activities, serving as internal corridors or distribution spaces from which other spaces are accessed.

6.7.2 Open courtyards: multi-functional outdoor living spaces

Space syntax analyses confirm the courtyard as the most integrated space in Tangale compounds, confirming the second hypothesis. It is the most multi-functional of all Tangale spaces where many household activities occur, even in the latest bungalow typologies. As discussed in Chapter Five, most activities take place outdoors; consequently the courtyard serves as an outdoor living room. This fosters close kinship and social network established from traditional times as well as providing a relatively private environment in a hot climate where other household functions such as washing up, cooking, socializing, leisure, maintenance and eating occur.

6.7.3 Compound transformations according to family size and lifestyle

Due to its multi-functional nature, the courtyard is the most flexible of all Tangale spaces. It is consequently the most transformed space, greatly influenced by changes in family size, composition and social organization, its growth only hampered by boundaries of the family plot. This is evident in changing compound patterns which are essentially courtyards being transformed to accommodate changing patterns of space use and new building forms.

These two findings on courtyards and compound transformation patterns quantitatively support the theory that certain aspects of the culture, expressed in community compounds have been retained in resistance to external mediating factors and resulting compound transformations. Other aspects sustained include the retention of other basic spaces such as forecourts, verandas, bedrooms, baths; locating compounds within occupied clan lands and use of single accesses for the majority of compounds. These are largely due to certain socio-cultural themes established in the culture from traditional times.

6.7.4 Socio-cultural factors: sustained themes through traditional to contemporary vernacular housing transformations

Through the transformations and changes documented via the measured survey and interview responses, certain socio-cultural themes were sustained. These include kinship, security basic needs and gender roles largely because they are intricately interwoven within the cultural fabric of the Tangale community. Urbanization played an important role in the changes observed for some of these factors, notably the emergence of social status and the role of women as CHs, the former being evident in the increasing use of concrete as a building material in a low income community.

These set of findings partly bridge the gap existing due to dearth of architectural information in the study area, providing documented data relating to spatial morphology of Tangale compounds and socio-cultural factors influencing housing in the community. While extensive studies are useful, this research, alongside others discussed in the literature review demonstrate that culture specific research, which generates theory, should be pursued with diligence if housing problems in Nigeria are to be adequately addressed (Rikko and Gwatau, 2011).

A weakness of the approach is the observation of space use by the researcher and most used space for CHs and their spouses from interview responses. A more robust method would entail a detailed documentation of activities of all members of a compound filled in their own time diary over a period including five weekdays and a weekend. "Recording activities and movements by the families themselves, individually, provides a snapshot into their daily lives not taken by anyone else but by the participants" (Asquith 2006b:7). The main impediment to this approach in the Tangale community was the time needed to explain the workings of the method to a populace

unaccustomed to filling out survey related forms. CHs and their spouses generally found it too cumbersome to use. The pilot study revealed that many respondents found this a difficult task but were quite willing to talk about spaces they used the most. Additionally, space syntax was employed to analyse convex spaces with no regard for the effect of views and openings on space use. How these influence the findings is also yet to be ascertained. Another weakness of the interdisciplinary methods employed in this chapter is the little consideration paid environmental factors which may play an equally important role on house form, functions and activities especially the use of courtyards in a hot climate. Nonetheless, findings from this survey and analysis underscore the wealth of information interdisciplinary approaches such as employed in this study can provide.

In addressing the first hypothesis of the study, quantitative data from a measured survey using architectural techniques were employed to test the notion that architecture reflects changes in culture, an idea generated from qualitative approaches of anthropology and sociology at the end of Chapter Five. Similarly, space syntax analysis, from architecture was deployed to test the validity of aspects of the built environment that had resisted change throughout the course of compound and housing transformations, the idea that architecture serves as a mechanism of cultural resistance in the study area. Results from this chapter suggest that architecture, expressed in the residential built forms of the Tangale community plays both a passive and active role with regards culture, supporting both the first and second hypotheses of the study. By conforming and modifying to changes within dynamic culture, architecture plays a passive role in reflecting and containing these changes as revealed by the changing typologies largely influenced by external factors of British colonialism, Islamic tradesmen, Christian missionaries and infrastructural development by the Nigerian government after independence. The sustained location of compounds within occupied clan lands, use of single accesses into compounds, use of courtyards and forecourts as living

spaces and the adoption of basic spaces including bedrooms, verandas, baths and kitchens furnish evidence of cultural resistance throughout the transformation process. These are based on socio-cultural factors of kinship, security, gender roles and basic needs serving as active agents of cultural resistance. From the foregoing discussion, it can be argued that compounds produced by community residents have managed to balance this dynamic relationship and tension existing between the passive and active roles architecture plays. The next chapter explores how prototype housing units designed by professionals have fared in this regard.

Conclusion

In view of findings from testing the hypothesis posed by the study, the present reality in the community suggests that architecture, expressed by domestic buildings, both serves as a container and reflector of dynamic culture in a passive way as well as a mechanism of cultural resistance to external influences in an active capacity. Socio-cultural themes of kinship, security, basic needs and gender roles are the active agents which need to be considered for issues regarding housing and urban development in the study area. Consequently, these findings are employed in Chapter Seven to explore issues relating abandoned and modified prototype housing units in the community.

CHAPTER SEVEN: **PROTOTYPE HOUSING IN TANGALE LAND**

Summary

This chapter examines possible reasons behind the abandonment and modification of prototype housing units in Billiri under the premise that some active agents of cultural resistance identified in Chapter Six were not deployed in the design of the units. Results suggest socio-cultural factors relating to kinship, security and basic needs were not adequately reflected in the design and location of the housing units, which may account for their abandonment and modification. This has implications for future housing policies regarding urban planning and housing design in the area.

7.1 Abandoned and modified prototype units in the study area

Throughout the history of housing as an institutionalized concept in Nigeria, successive governments over the years tried to formulate cohesive plans, programmes and policies that cater to the housing needs of a teeming Nigerian populace, with varying degrees of successes and lapses. These include plans in the Colonial period, Post Independence period, the 1980 National Housing Policy (NHP), the 1991 NHP and the latest signed into law, the 2006 NHP. The 1980 NHP, formulated during the first civilian regime headed by Alhaji Shehu Shagari represented the Federal Government's objectives in the fourth National Development Plan. Its main objective was direct construction of housing units and mortgage financing, both tied to proper and adequate policy implementation. This period witnessed the famous Shagari low cost housing scheme executed in most LGA headquarters in the country. 80% of the houses comprising one-bedroom prototype units were targeted for the low-income group who earned not more than ₦ 5,000 (\$ 31.76) per annum. Jinadu (2007) notes that a total of 47,500 houses were constructed between 1979 and 1983, with the sum of ₦ 1.59 billion (\$ 10.099,680 million) allocated housing development between 1980 and 1985. With such huge sums expended, it is a matter of concern when some of these

units are not used as intended, or worse still, completely abandoned. Such is the case in Billiri, Tangale land outlined as the third problem in this study¹⁰².

The inadequacy of public housing schemes not an isolated issue. "Research has confirmed the profound inadequacy in the housing circumstances of Nigerians, in particular the low-income population" (Olotuah and Ajenifujah 2009:88). Popoola's research outlined in Chapter Two arose from the observation that public housing schemes in Nigeria gave the "impression that inhabitants can be defined in terms of some numerical average that can be fitted into public housing environments" (Popoola 1984:31). While this has been re-iterated by other studies and stakeholders in the housing industry (Onibokun 1990, Matazu 2008, Adejumo 2009), further research in communities where public housing has failed needs to be carried out in order to correct "the wrong perception of the needs of low-income earners by government giving rise to the provision of inadequate and wrong kinds of housing and housing aids for them" (Olotuah and Ajenifujah 2009:89). While a large body of literature focusing on user transformation of government provided public housing often in reaction to their being inadequate exists (Diang'a and Hayangah 2011, Sheuya 2009, Tipple 2000, Tipple et al. 2000, Tipple and Salim 1999, Tipple 1999, Arimah 1999, Salim 1998, Shiferaw 1998), comparatively little attention has been paid abandoned prototype housing especially in Nigeria. Abandoned units such as constructed in Billiri are currently without occupants. Consequently, documenting dysfunction the traditional way by taking stock of user modifications is difficult. Only floor plans, layouts, community reactions and opinions may be available for analysis.

This Chapter explores the possible reasons behind the abandonment and modification of such units in the study area by comparing basic syntactic measures and patterns of space use from compounds in the community sample documented in Chapter Six and those from the prototype units. The aim is to

¹⁰² Refer to p. 12.

examine if any spatial or morphological differences exist between houses built by the community and the units. Underlying this enquiry is the premise that certain traditional themes, sustained over time, may not have been incorporated in the design of the units to account for their abandonment or modification.

7.2 The prototype units

Two sets of prototype units were used for this comparison. The first set, Pro I consists of one bedroom core duplex units situated some metres from the A345 constructed in the 1980's as part of a national housing scheme in most LGAs of Nigeria. Twenty of such units are presently abandoned in Billiri. The second type, Pro II is found in major towns across the North East region of the country, with four of such in Billiri, also along the A345. The houses comprise of three bedroom bungalows in front and servant quarters at the rear¹⁰³. Three of these units were either abandoned but one, Pro II mod, has been modified and is presently occupied¹⁰⁴.

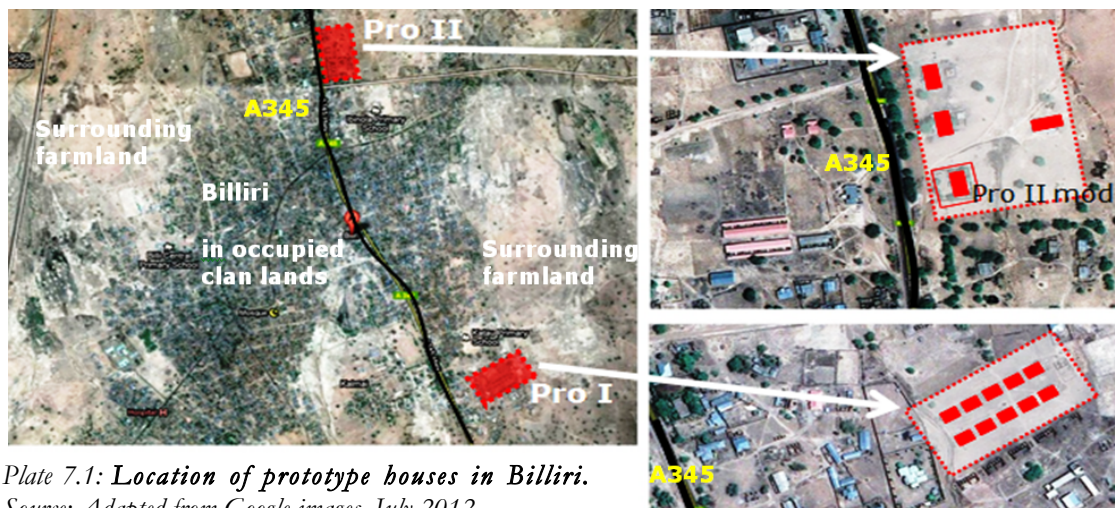


Plate 7.1: Location of prototype houses in Billiri.
Source: Adapted from Google images, July 2012

¹⁰³ See Figure 7.2

¹⁰⁴ Refer to Figure 7.3



Plate 7.2: **Prototype I, one of the empty units, front elevation.** Courtesy: David Maina, July 2012



Plate 7.3: **Prototype I units.** Courtesy: David Maina, July 2012



Plate 7.4: **Prototype II.** Courtesy: David Maina, July 2012



Plate 7.5: **Prototype II, front elevation.** Courtesy: David Maina, July 2012

7.3 Approach and methods for comparing housing in the study area

For comparative purposes, basic syntactic data from space syntax analysis such as IVs and H^* from the 45 compounds were used to establish possible cultural genotypes in the sample. Floor plans of the units obtained from fieldwork and cross-checked with the State Ministry of Works were subjected to a similar analysis. Modifications made to Pro II mod, which demonstrate alterations by occupants were also noted.

To compare patterns of activities and space use, activities carried out within compounds and houses were recorded during the course of a day. A total of 1620 activities were observed within compounds inhabited by residents of the

community¹⁰⁵. These were classified under 9 broad categories-socialization, personal needs, eating, leisure, farm related/storage work, animal husbandry, maintenance, food preparation/cooking and economic activities. The IV for the space an activity was most observed in was then assigned that category in a compound. For example, 24 activities were observed in compound 1. Socialization related activities were observed within the courtyard and outside space, with 4 out of 5 of these activities occurring outside. Thus the average IV for the outside space across the community sample, 1.04¹⁰⁶ was assigned socialization for compound 1. Where the number of activities for a category was observed equally between two or more spaces, for instance, farm related/storage work observed in the kitchen and bedroom, the average IV of these spaces, 0.93 was recorded. The IV of each category was then averaged for all compounds. This graphically demonstrated which activities took place within highly integrated areas or otherwise as well as the fit between space use and spatial layout. Dawson (2008) employed a similar approach to establish the degree of fit between Inuit spatial needs and layouts of Euro-Canadian houses.

Similarly, 55 activities were observed within Pro II mod¹⁰⁷. Spaces in Pro I and II, the abandoned prototype housing units, were assigned activities based on designated labeled functions. Sitting rooms were assigned socialization, kitchens were assigned food preparation/cooking while bedrooms were assigned personal needs related activities. The results of these analyses are presented below.

7.4 Cultural genotypes from the community sample

Using the difference factor, H^* discussed on p. 73-74, results suggest the presence of two inequality genotypes within the community sample (Maina, 2012c, 2013a). These are presented in *Table 7.1*.

¹⁰⁵ *Appendix 10*

¹⁰⁶ *Table 7.2*

¹⁰⁷ *Appendix 10*

Table 7.1: Basic syntactic data, community sample and prototype units

Cpd. No.	K spaces	Min. IV	Function	Depth from outside	Mean IV	Max. IV	Function	Depth from outside	H*	Space link ratio
Genotype 1										
2	13	0.63	Br	4	1.21	3.03	Ct	1	0.61	1
3	7	0.64	Br	3	1.1	2.55	Ct	1	0.69	1
4	8	0.46	Br	4	1	2.3	Ct	1	0.59	1
6	11	0.63	Ct	3	1.07	2.65	Ct	1	0.68	1
7	13	0.76	Rm	3	1.39	4.55	Ct	1	0.55	1
8	18	0.59	Br	3	1.09	2.48	Ct	1	0.66	1
9	12	0.58	Br	4	1.19	3.13	Ct	1	0.57	1
10	9	0.74	Br	3	1.43	4.44	Ct	1	0.55	1
11	11	0.63	Ø	4	1.07	2.65	Ct	1	0.68	1
12	8	0.69	Br	2	1.28	3.45	Ct	1	0.62	1
13	11	0.53	Br	3	0.98	2.21	Ct	1	0.67	1
17	13	0.61	Br	4	1.11	2.6	Ct	1	0.66	1.08
20	9	0.63	Br	2	1.35	4.44	Ct	1	0.5	1
21	11	0.58	Br	4	1.24	3.32	Ct	1	0.54	1
23	9	0.59	Br	4	1.13	2.96	Ct	2	0.61	1
24	17	0.64	Br	4	1.2	2.93	Ct	1	0.63	1
25	9	0.74	Br	3	1.4	4.44	Ct	1	0.56	1
27	14	0.59	Br	4	1.35	4.16	Ct	1	0.47	1
29	11	0.53	Br	4	1.19	3.32	Ct	1	0.51	1
31	9	0.49	Br	4	1.13	2.96	Ct	1	0.52	1
34	9	0.52	Br	4	1.04	2.22	Ct	1	0.66	1
35	24	0.57	Wc	5	1.19	2.72	Ct	1	0.6	1.04
37	14	0.8	Br	2	1.49	5.2	Ct	1	0.53	1
39	22	0.69	Br	4	1.25	3	Ct	1	0.65	1
40	9	0.52	Br	4	1.04	2.22	Ct	1	0.66	1
Mean	12	0.62		3.5	1.2	3.2		1.1	0.6	1
Genotype 2										
18	28	0.55	Br	5	0.92	1.74	Ct	2	0.77	1
19	23	0.58	Br	5	0.93	1.79	Ct	1	0.77	1
22	29	0.58	Br	7	0.97	1.94	Ct	3	0.75	1.07
30	16	0.54	Br	4	0.9	1.76	Ct	1	0.76	1.06
32	16	0.68	Br	4	1.02	2.03	Ct	1	0.79	1.06
33	20	0.57	Dr	4	1.02	1.75	Ct	1	0.77	1.2
36	15	0.52	An	6	0.9	1.96	Ct	1	0.71	1.13
43	14	0.65	Br	4	1	2.08	Ct	1	0.77	1
Mean	20	0.58		4.9	0.96	1.88		1.4	0.76	1.07
Non-genotype										
1	7	1.02	Ct	1	0.87	1.02	Ø	2	0.97	1
5	11	0.55	Br	4	1.4	4.42	Ct	1	0.41	1.09
14	8	0.53	Br	4	0.84	1.38	Ct	1.5	0.83	1
15	5	0.7	Ct	1	0.56	0.7	Ø	2	0.96	1
16	16	0.56	Rm	4	0.98	1.55	Kt	3	0.8	1.13
26	6	0.87	Ct	1	0.73	0.87	Ø	2	0.97	1
28	16	0.52	Br	4	1.33	3.77	Ct	2	0.42	1
38	31	0.61	An	6	1.07	1.8	Vr	2	0.78	1.16
41	16	0.61	St	5	0.94	1.76	Sr	3	0.8	1.06
42	16	0.63	Wc	5	1	1.65	Sr, Dr	3.5	0.83	1.06
44	17	0.81	Wc	6	1.33	3.7	Co	4	0.65	1.12
45	11	0.58	An	5	0.8	1.33	Sr	3	0.87	1
Mean	13	0.67		3.8	1	2		2.4	0.77	1.05
Pro I	8	0.69	Bt	3	2.07	3.45	Co	1	0.62	1.13
Pro II	22	0.73	Wc, St	4	1.11	1.96	Ø	N.A	0.82	1.05
Pro II mod	21	0.62	Wc	4	1.17	2.32	Ct, Sr	1	0.7	1.1

*SD: step depth/number of steps from the outside space to either most or least integrated space

The first suggested genotype contains compounds with H^* values which range from 0.47 to 0.69. These compounds have high IVs (average of 3.2) for the most integrated spaces, which were all open courtyards. These are shallow in depth, 1 step away from the outside space. Poorly integrated spaces commonly bedrooms, were located at depths of 3 to 4 steps away from the outside space at the ends of non-ringy tree like JPGs (average space link ratio of 1). The first genotype is suggestive of the vernacular tradition in the community, which is the closest configuration to the traditional house form in Tangale land, or its conservative mode (Hillier 2007, Psarra 2009). Movement through these compounds follows a simple syntax from the outside space or forecourt, which usually faces a footpath or street into the open courtyard before accessing other rooms or functional spaces 2 or 3 steps deep from the forecourt.

The second range of H^* values, 0.70 through 0.79, comprise eight compounds with relatively lower IVs for the most integrated spaces, which are also courtyards with an average IV of 1.88. These are often deeper within the compounds (average step depth of 1.4) compared to 1 for the first genotype. They are characterized by a higher number of k-spaces (average of 20 per compound) with a higher space link ratio of 1.07, suggestive of ringy configurations. This second set of compounds exhibit characteristics of a hybrid between traditional compounds in genotype 1 and the latest style of freestanding bungalows inhabited by some residents of the community. The latter were classified under the non-genotype category. Spatially, compounds in genotype 2 have bedrooms located deeper within the hierarchy of spatial organization or are more segregated than bedrooms in the first genotype. They commonly contain more than one set of individual houses and rooms, which often accommodate extended or multiple families, correlating with the large number of k-spaces within them. They are consequently often complex, with courtyards subdivided

into narrow streets¹⁰⁸. These are compounds in transition or transformation between the traditional and the contemporary, lending towards a generative mode (Psarra, 2009).

H^* values out of these two ranges (below 0.47 and above 0.79) or whose principal characteristics differ from those described above were classified in the non-genotype category. These include four out of five bungalows (Compounds 41, 42, 44 and 45), which contain sitting rooms and corridors as the most integrated spaces in part because professionals and not their owners designed them, unlike compounds in genotype 1 and 2. The most integrated spaces in these houses however all lie on rings passing through or having direct access to a veranda or open courtyard.

7.5 Syntactic measures and modifications from the prototype units

Having established these characteristics within the community sample, comparison was then made with similar values obtained from the prototype units. Pro I units had high IVs of 3.45 for the most integrated space, a corridor which links other spaces within a compact floor plan (*Figure 7.1*). The corridors were found to lie on a single ring within the unit, which is a step away from the outside space. This in part explains why the units have H^* values of 0.62, which could be categorized under genotype 1. The units however contain no courtyards, thus negating a major characteristic of the suggested genotype (Maina 2012c, 2013a). They are also small, containing a single bedroom in contrast to compounds in the community sample, which contain an average of 3.7 bedrooms per compound¹⁰⁹. Furthermore, the units are located out of occupied clan lands. *Plate 7.1* illustrates the extents of current physical development, meaning the units were located even further away from built up clan areas two decades ago when they were constructed in the early 1980s. Occupied clan lands in the community are

¹⁰⁸ Refer to the discussion on compound transformations on page 249, *Figures 6.8, 18, 19 and 22*.

¹⁰⁹ *Table 7.2*

organized based on a strong patrilineal kinship settlement pattern from traditional times in part for security. Consequently, this observation would impinge on kinship, social network and security in the community.

Figure 7.1: *Prototype I*

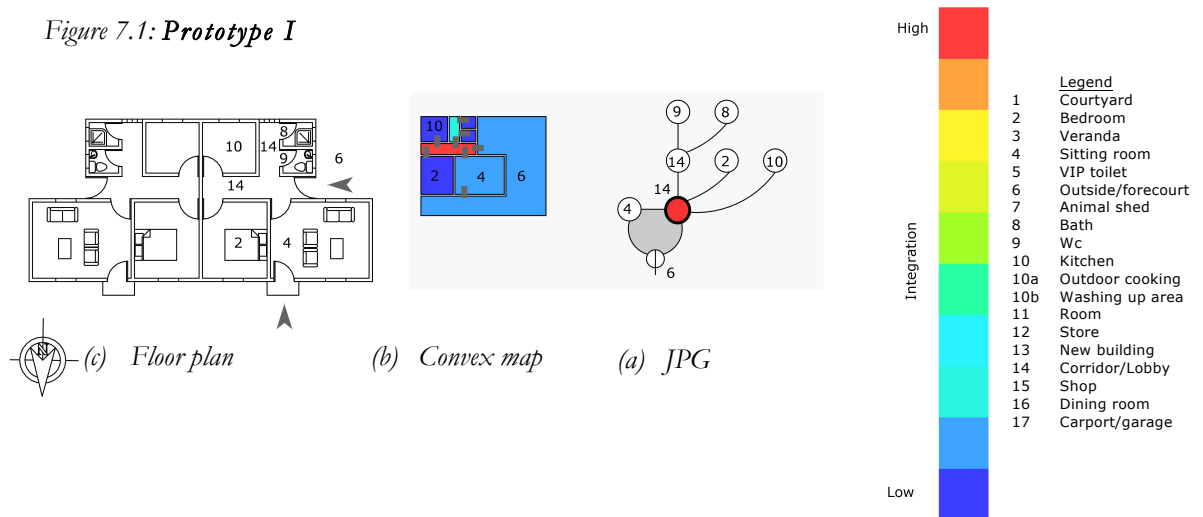


Table 7.2: *Average integration values for spaces within compounds and prototype units**

S/No	Function	Abbrev	The Compounds		Prototype I		Prototype II		Prototype II mod	
			No	Av. IV	No	Av. IV	No	Av. IV	No	Av. IV
1	Courtyard	Ct	71	2.05	N. A.	—	1	1.88	1	2.32
2	Bedroom	Br	166	0.8	1	0.86	5	0.93	5	0.97
3	Veranda	Vr	55	1.34	N. A.	—	2	1.37	2	1.14
4	Sitting room	Sr	39	1.08	1	0.99	1	1.36	2	1.84
5	VIP toilet	Vp	32	0.95	N. A.	—	N. A.	—	N. A.	—
6	Outside space	Ø	45	1.04	1	0.99	1	1.9	1	1.19
7	Animal shed	An	36	0.98	N. A.	—	N. A.	—	1	0.77
8	Bath	Bt	19	0.92	1	0.69	2	0.89	2	1.0
9	Wc	Wc	10	0.23	1	0.69	3	0.91	3	0.96
10	Kitchen	Kt	44	1.04	1	0.86	3	0.87	2	1.21
11	Room	Rm	37	1.11	N. A.	—	N. A.	—	N.A.	—
12	Store	St	30	0.88	N. A.	—	2	0.85	2	1.13
13	New building	Nb	7	0.87	N. A.	—	N. A.	—	N. A.	—
14	Corridor	Co	15	0.8	2	2.59	N. A.	—	N. A.	—
15	Shop	Sh	7	0.7	N. A.	—	N. A.	—	N. A.	—
16	Dining room	Dr	6	0.67	N. A.	—	1	1.67	N. A.	—
17	Carport/Garage	Cp	3	1.11	N. A.	—	1	1.05	N. A.	—
Total			622	16.57	8	7.67	22	13.68	21	12.53
Mean IV				1.11		2.07		1.11		1.17

*Adapted from Maina (2012c, 2013a)

Spatial analysis of Pro II units reveal that the outside or forecourt was the most integrated space in part because it serves as a link between the service quarters and the main house (*Figure 7.2*). This finding is supported by a space link ratio of 1.05, which is suggestive of a ringy configuration. The H^* value of 0.82 would place the units within the non-genotype category of the community sample. The design of these units was likely inspired by colonial patterns of domestic living where servants form part of the day-to-day functioning of households, Nigeria having been colonized by the British from 1900-1960 (Colonial Nigeria, 2013). This correlates with the observation made earlier that some compounds within the non-genotype category were designed by professionals and not by residents of the community. Consequently, the units were found to contain atypical spaces in the community sample, namely dining halls and garages¹¹⁰. Unlike Pro I units however, Pro II units were located within occupied clan lands.

The modified version of this prototype, Pro II mod has the open courtyard and sitting room as the most integrated spaces. Both are shallow in depth from the outside space or forecourt in part because its occupants constructed a larger courtyard that links the service quarters to the main house (*Figure 7.3*). Other modifications to the house, which are suggestive of discomfort or dissatisfaction, largely involve structural changes. These include the expansion of the original courtyard walls in the main house, the conversion of the garage into an animals feeds store, the expansion of the kitchen store and guest bedroom in the main house and the conversion of the dining hall into a family living room. Not surprisingly, the H^* value for the modified unit, 0.7 places the unit in the second genotype category of the community sample.

¹¹⁰ The community sample contained only 6 dining rooms and 3 garages, out of a total of 622 documented spaces, *Table 7.2*.

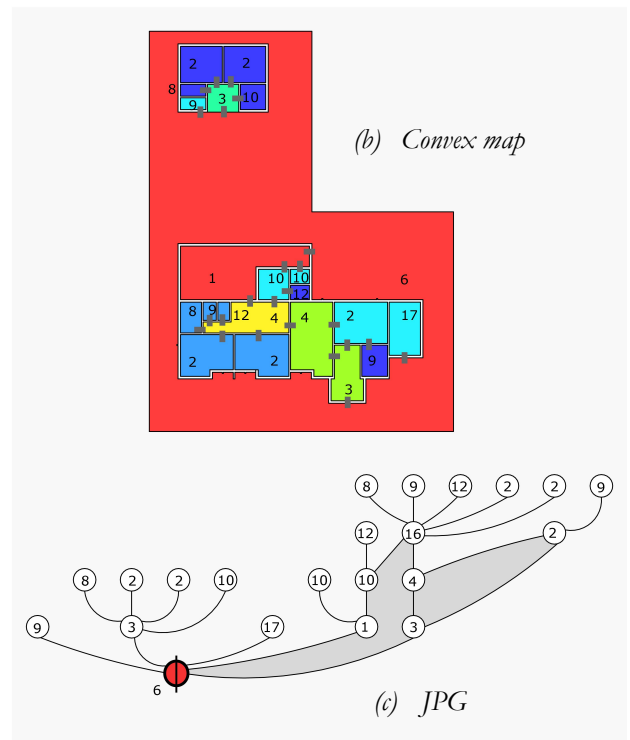
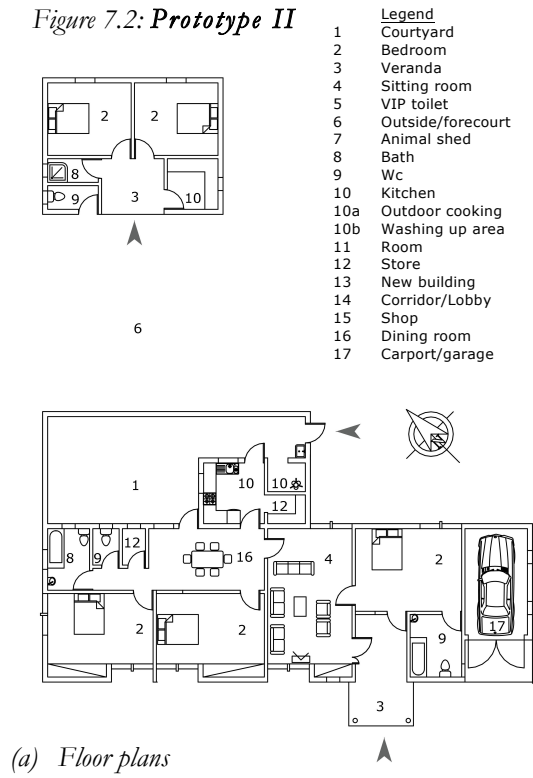
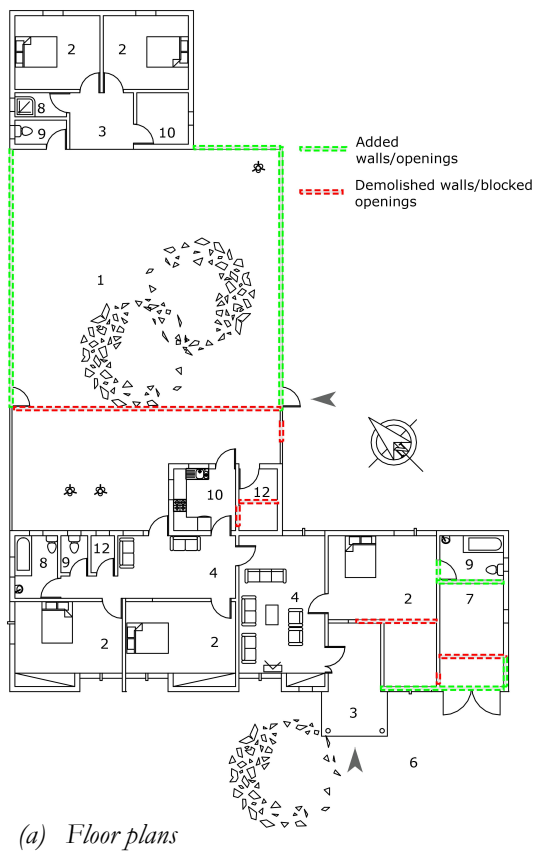
Figure 7.2: *Prototype II*Figure 7.3: *Prototype II mod*

Table 7.3: *Changes and modifications by occupants of Pro II mod*

S/No	Structural changes	Non-structural changes
1	Expansion of original courtyard walls	Conversion of the dining hall space into a family sitting/living room
2	Construction of new courtyard walls linking service quarters to the main house	
3	Smaller kitchen merged with store	
4	Expansion of guest bedroom in the main house	
5	Conversion of the garage into an animal feeds area/store	
6	Expansion of original garage walls	

7.6 Findings from observed activities and patterns of space use

Patterns of space use within the compounds reveal that activities related to basic needs and gender roles such as food preparation, maintenance, farm related work, eating, leisure and socialization were frequently observed to occur in highly integrated spaces notably open courtyards, verandas and sitting rooms. This would explain why the average IVs of such activities are generally above 1 for the compounds. Activities related to personal needs were frequently observed to occur within the confines of segregated spaces such as bedrooms, baths and toilets. This was also true of animal pens and shops, the latter being a recent addition to a few compounds. This pattern of space use and activities is reflected in the modified unit, Pro II mod as its original layout was altered to conform to the lifestyle of its occupants, who are resident in the community. Most basic functions and activities follow a similar pattern to those observed within the compounds with basic needs and gender related activities occurring in well-integrated areas (Table 7.4, Figure 7.4).

Table 7.4: *Summary of activities and corresponding IVs for the compounds and units*

Categories of activities	Socialization (Soc)	Personal Needs (PN)	Eating (Eat)	Leisure (Lei)	Farm work (FW)	Animal husbandry (Ani)	Maintenance etc (Oth)	Food prep (FFP)	Economic activities (Eco)
Compounds	1.39	0.93	1.64	1.63	1.78	0.87	1.89	1.99	0.29
Pro II mod	1.84	0.97	1.84	1.14	2.32	2.32	1.76	2.32	0
Pro II	1.88	0.91	1.67	1.15	1.37	0	0.85	1.38	0
Pro I	0.99	0.75	0.99	0.86	0	0	0	0.86	0

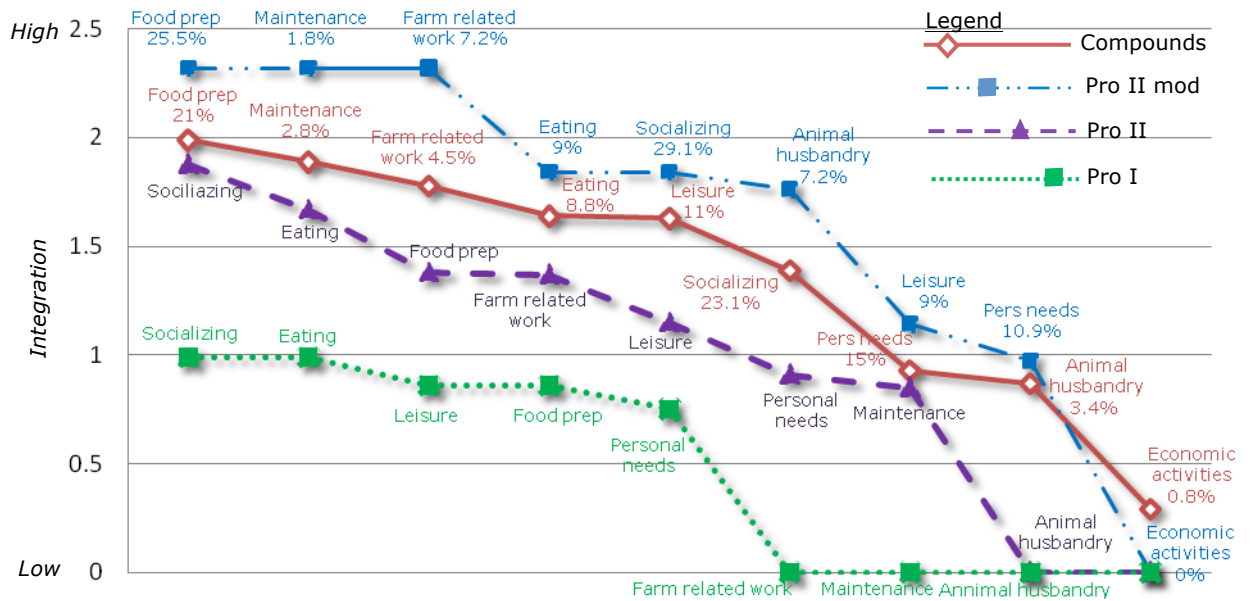


Figure 7.4: Activities and space use for compounds and prototype units (Maina, 2013a)

Pro II differs slightly from this pattern with socialization related activities assigned the most integrated spaces in part because the house consists of two separate buildings linked by the outside/forecourt, which is the most integrated space for this prototype.

Pro I units reveal a marked difference in the established community pattern with relatively lower values for basic functions such as socialization, eating and leisure in part due to the units lacking courtyards or verandas. Courtyards and verandas account for 45% and 12% of observed activities within the community compounds. In Pro II mod, 34% and 16% of all household activities were observed within these spaces (Figures 7.5, 7.6). Furthermore, the most integrated spaces within Pro I units were found to be corridors, which would serve only circulation purposes owing to their narrow widths (Figure 7.1). This finding suggests that the units would have inadequately and uncomfortably supported the day-to-day activities of typical households within the community as is without modifications or alterations, preferring more reasons for their abandonment.

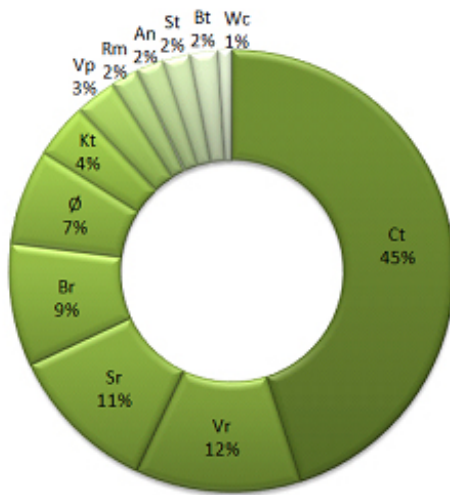


Figure 7.5: *Activities observed within functional spaces for compounds*
(Appendix 10)

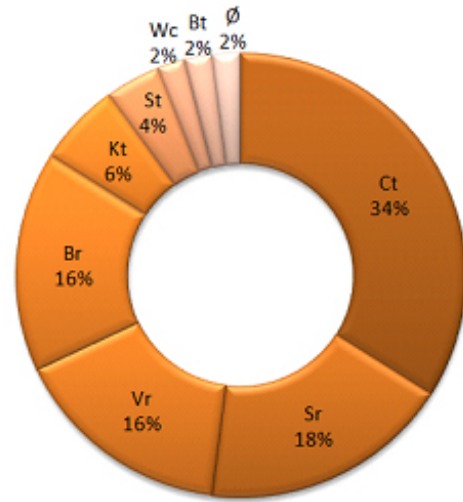


Figure 7.6: *Activities observed within functional spaces, Pro II mod*
(Appendix 15 ii)

7.7 Implication of findings

7.7.1 Kinship and security considerations for compounds

The measured survey revealed that Tangale compounds are usually located within clan areas inhabited by patrilineal related households that support strong kinship and social networks in the community. This is evident in the high level of socialization observed within the compounds. Sustained from traditional times, this custom was necessary in part for security from inter tribal wars especially with neighboring communities¹¹¹. Consequently, farmlands to the south east of Billiri towards Kaltungo are generally considered insecure by Tangale standards. Pro I units are located within this area (Plate 7.1). Many residents interviewed during the survey noted that this insecure location was a disadvantage to comfortably occupying the units. In addition, most compounds had a single entrance and exit, which enhanced security (Maina, 2012c). This observation is supported by the relatively non-ringy space link configuration of most compounds within the community sample.

¹¹¹ p. 127

7.7.2 Basic needs and functional spaces: courtyards and verandas

Space syntax analyses confirm courtyards are the most integrated spaces within compounds with an average value of 2.05. These are followed by verandas, which have an average value of 1.34. Together, these spaces support a total of 57% and 52% of all household activities observed within the compounds and Pro II mod respectively.¹¹² This is because activities related to basic needs and gender roles such as socialization, eating, food preparation, cooking and maintenance were frequently observed to occur within open courtyards and covered verandas. The complete absence of such vital spaces in Pro I would thus impinge on the day-to-day functioning of most Tangale households (Maina, 2013a).

Courtyards also serve as linkages between various parts of Tangale compounds. Consequently, the spatial organization of houses such as Pro II where courtyards do not adequately link all sections of a house have a high tendency of being modified to meet this requirement, as carried out by occupants of Pro II mod. When spaces other than courtyards are the most integrated in a compound, they are commonly found to have direct access to a veranda or courtyard. Where sitting rooms, dining rooms, corridors or kitchens were the most integrated spaces, often obtained in the non-category category, they were 1 step away from the courtyard or veranda (*Figures 7.7, 7.8*). Furthermore, spaces considered atypical within the community such as dining halls or garages are likely to be converted into functional spaces that cater to the basic needs of Tangale households. Such was the case in Pro II mod where occupants converted similar spaces into a family living room and animal feeds store respectively. Unfortunately, such modifications frequently involve structural changes that could undermine the structural integrity of the houses.

¹¹² *Figures 7.4 and 7.5*

7.7.3 Flexibility for bedrooms and sleeping spaces

Pro I units were targeted for low-income earners in the 1980s as part of a federal government housing scheme across most LGAs in Nigeria (FGN, 2006). Unfortunately, large families usually characterize this group, which in part justifies the need for constructing additional sleeping spaces. This is an oft-cited reason proffered for the transformation of government housing over time. "The number of bedrooms present and even the sizes of the available interior spaces in the original houses were considered grossly inadequate for the low income earner who probably has a large nuclear family and an over bearing extended family to contend with" (Aduwo 2011:275). The community sample had an average of 3.7 bedrooms per compound. In contrast, Pro I units contain single bedrooms which are unlikely to adequately support large families without some form of modification or transformation.

7.8 Linking theory to practice, implications for urban planning and architectural design

This chapter presented findings from spatial analyses and patterns of space use from compounds produced and inhabited by residents in the Tangale community and abandoned/modified government provided prototype units in Billiri. Results reveal that Pro I units are inadequately located far from occupied clan lands in areas considered insecure by the community. Furthermore, these units lack basic spaces by Tangale standards, notably courtyards and verandas. They also contain single bedrooms to accommodate frequently large families of low-income earners who constitute the targeted group for the units. Together, these findings relate to the inadequate reflection of sustained and active agents of architectural resistance in the community and suggest possible reasons behind the abandonment of the units in Billiri for almost two decades.

Pro II units improve on this dismal statistic, being located within occupied clan lands. The units were also found to contain basic spaces necessary for the diurnal functioning of Tangale households such as courtyards, verandas and sufficient bedrooms. The courtyards were however found to inadequately link all parts of the house, a vital characteristic of courtyards in compounds within the community sample. This in part necessitated occupants of Pro II mod to modify the original design as well as convert atypical spaces within the units to fit their present needs and comfort. Together, these findings highlight the inadequate link between theory and practice in the study area.

Linking theory to practice by incorporating sustained cultural themes for housing and urban developments in Tangale land is advantageous for future projects involving government, private investors and members of the community if problems relating abandonment and modifications are to be avoided. This is expedient in two notable areas, the location and design of residential units.

7.8.1 Location of residential units in occupied clan lands

Housing units in Tangale land need to be located within or around occupied clan areas for security encouraged by established kinship and social network practiced from traditional times in the community. As this study revealed, implementing this simple measure greatly improves the chances of housing units being occupied instead of left abandoned. Ultimately, this goes a long way into ensuring that public funds allocated towards such projects are well utilized for the purposes they were intended (Maina, 2013a).

7.8.2 Basic design considerations and spatial requirements

As this study has illustrated, it is imperative that housing units contain spaces considered basic in Tangale compounds, notably courtyards and verandas whilst being flexible enough to accommodate additional bedrooms or sleeping spaces either as part of the existing structure or within confines of the compound. Courtyards, besides serving other functions, were also found to link separate parts of most compounds in the community sample. This should be taken into account in the design of future residential units in the community. Consequently, where houses are designed as bungalows or as single units, the most integrated space (often not a courtyard), should ideally be directly linked to a veranda or courtyard. In other words, the most integrated space in a house when not a courtyard, should have a step depth of 1 from a veranda or courtyard (Figures 7.7 and 7.8). Together, these design considerations have been shown to support the day-to-day activities of many Tangale households (Maina, 2013a).

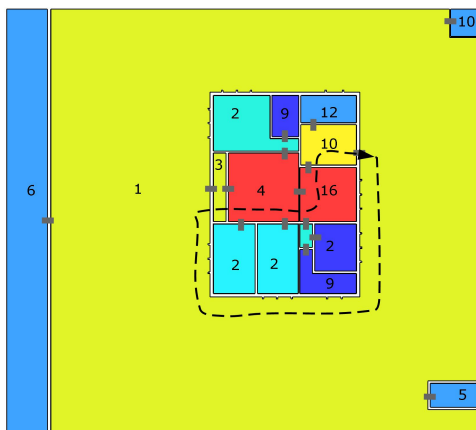


Figure 7.7: Convex map of Compound 42 with dotted lines showing link between high IV spaces (Sr; 4, Dr; 16) and the veranda (3) and courtyard (1)

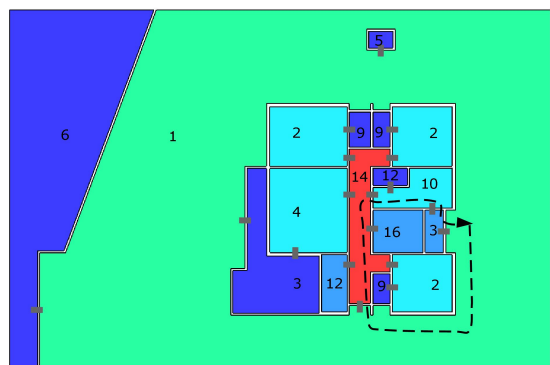


Figure 7.8: Convex map of Compound 44 with dotted lines showing link between high IV space (Co, 14) and the courtyard (1)

Findings from this study, while not exhaustive suggest that careful planning and proper implementation of sustained cultural values as passive agents of change and active mechanisms of cultural resistance in housing would have gone a long way towards ensuring occupancy of the units. In contrast to the suggestion that community compounds manage the dynamic relationship between passive and active agents of culture, findings from this chapter suggest that public housing units provided by government have not been as successful in this regard without the intervention of residents as illustrated in *Figure 7.3*. The findings also demonstrate that dearth of this kind of information can have dire consequences and often times frustrate what was otherwise conceived as a beneficial venture as these cases in Billiri have proven. Furthermore, it underscores the value of combining quantitative and qualitative methods in issues regarding housing and culture especially in non-western communities.

Space syntax, a qualitative method was employed to determine the spatial morphology of community-produced compounds and government provided prototype units. This objective approach mitigates the subjective nature of observations of space use, which is open to several interpretations as observed at the end of Chapters Five and Six. Importantly, space syntax analyses of the prototype units were carried out based on space use patterns of community residents. While it can be argued that occupants may not necessarily use spaces according to designated labels, the prototype units studied were either too small and compact to offer other alternative options for possible space use (*Figure 7.1*) or evidence was provided on how occupants really used the spaces in an occupied equivalent (*Figure 7.3*). There was however, only one example of the occupied prototype, Pro II mod to form a firm conclusion on possible reasons for the inadequacy of the modified prototype housing units.

These weaknesses notwithstanding, combining the two approaches from architecture (space syntax) and behavioural sciences (observations of space use) was beneficial in providing reasonable explanations behind the abandonment and modification of the prototype units. In this regard, an interdisciplinary approach was useful in establishing some guides for future developments in urban planning and architectural design, linking theory to practice in the study area.

Conclusion

This chapter presented findings on investigations regarding the possible reasons behind the abandonment and modification of prototype units in the study area using interdisciplinary approaches from architecture and behavioral science. The premise was some cultural themes, identified in Chapter Six as passive agents of change and active mechanisms of cultural resistance were not adequately deployed in the design of the units to account for their remaining abandoned. Results suggest that kinship, security and basic needs were not adequately reflected in the location and design of the units. This has implications for future urban and housing developments in the community as well as the validity of employing interdisciplinary approaches to address housing related problems in indigenous communities.

PART THREE: CONCLUSIONS

“What is needed to make the active implementation of . . . vernacular know how come true in a modern developmental context is an investment in research and education that explicitly stresses the dynamic nature of vernacular traditions. By critically investigating the achievements and shortcomings of vernacular traditions and examining ways in which that which is valuable in the vernacular may be integrated with that which is valuable in modern architectural practice, it will be possible to develop, through upgrading and adaptation, those aspects of contemporary built environments that are currently unsustainable or culturally inappropriate.”

Linsay Asquith and **Marcel Vellinga**- Introduction. In Asquith, L. and Vellinga, M. (eds.) *Vernacular Architecture in the 21st Century: Theory, Education and Practice*. Oxon: Taylor and Francis, p. 6

CHAPTER EIGHT

CHAPTER EIGHT: **CONCLUSIONS, RECOMMENDATIONS AND AREAS FOR FURTHER RESEARCH**

Summary

This final chapter presents concluding remarks from discussions of previous chapters, re-iterating links between research aims, hypotheses and questions stated in the introductory chapter with the main findings presented in Chapters Five, Six and Seven. It also outlines the study's original contributions to the body of knowledge as well as recommendations and areas for further research.

8.1 Summary of key findings

In the introductory Chapter, three problems were enumerated as having an impact on housing in the study area. These include dearth of intensive architectural research, an observed increase in socially related problems such as the loss of cultural identity, high cost of housing, slums and crime as well as the abandonment and modification of government provided prototype housing units. Questions raised by the study sought to investigate the basic lifestyle of the community and how this was reflected in the morphology of their built environment. How have these changed over time, which factors and themes been sustained throughout the history of the community and what relationship exists between changes in the culture and observed social problems were also important questions related to the problems identified. Additionally, the study sought to investigate whether there are any spatial or morphological differences between compounds produced by community residents and those provided by government to explain the abandonment and modifications of the latter. Consequently, the study postulated two hypotheses. The first suggests changes within the culture influenced changes in the built environment, that architecture is a container and reflector of dynamic culture in a passive capacity. The second suggests that throughout these changes, certain cultural values have been sustained, one of which is the continued use of the open courtyard as an outdoor living space as a strategy for maintaining cultural identity. This supposes architecture as an active

agent of cultural resistance. The first four research questions were explored in Chapter Five, Tangale Ethnography. The validity of these questions and hypotheses related to theory were tested in Chapter Six, Housing in Tangale land. The last research question regarding prototype housing was the focus of Chapter Seven, which links theory to architectural practice in the study area.

Ethnographic accounts of the community presented in Chapter Five reveal the basic lifestyle of the community based on patrilineal kinship and strong social network from traditional times from the 13th-14th Century, in response to the first research question. Settlement patterns, political administration, access to farmland and compound layouts were organized round seven clans of the Tangale community in part for security and mutual dependence for communal labour deployed in farming, the primary occupation of the community as well as in war, hunting, building projects, marriages, festivals and other community related activities. These were largely delineated along gender roles. Men spent their time in forecourts outside compounds while the focus of most household functions associated with the female gender were conducted within confines of open courtyards, in a form of living 'inside out'. Other basic spaces such as sleeping and cooking huts, animal pens and baths were spatially organized around perimeters of courtyards. Granaries, collectively owned by extended families were centrally located to serve patrilineally related households within compounds. In response to the second research question, external influences in form of British colonials, Islamic tradesmen and Christian missionaries from 1900 were largely responsible for changes in the culture of the community. British Imperial rule fragmented the political structure of administration; Islamic tradesmen introduced foreign materials while Christian missionaries introduced monogamy, education, healthcare and rectilinear forms into the community. By 1948 when the community relocated to the surrounding lower plains from the hills they initially settled on, many aspects of the culture such as the language, religion,

marriage and communal family life, commerce, building technology, settlement patterns and infrastructure had been modified. Government intervention after Nigerian independence from 1960 positively resulted in the provision of tarmac roads, pipe borne water, electricity, basic healthcare and educational facilities in urban areas. Unfortunately, this encouraged urban migration and overstretching of public services largely responsible for the emergence of delinquency, unhealthy environments and slums, rising housing costs and insecurity observed in the community. This relationship between changes in lifestyle and observed social ills addresses the fourth research question of the study. In the built environment, these cultural changes found expression in new rectilinear forms, modified spatial organization, the introduction of function specific spaces and new building materials such as concrete and corrugated iron sheets evident in four housing transformation patterns documented in the study area. Additionally, traditional values related to kinship, security, gender roles and basic needs were observed to still play an active role in the built environment throughout the course of housing transformation, in support of the hypotheses posed in Chapter One. These were tested using quantitative methods in Chapter Six.

Documenting the housing situation via a measured survey of selected compounds as well as subjecting the floor plans to space syntax analyses formed the basis of testing the theories that architecture serves as a container and reflector of culture as well as a mechanism of cultural resistance in the study area. The analysis of scaled drawings of documented compounds along concepts derived from review of literature revealed both the link and impact of four main events in the history of the community to four housing typologies identified in Chapter Five. Clustered compounds in family lands made up of circular mud huts with thatched conical roofs constitute the first typology. These reflect the traditional way of life practiced on the Tangale hills prior to external influences. The gradual manifestation of rectilinear buildings often clad with corrugated iron

sheets in the community after the relocation of 1948 reflects the influence of colonial administrators, Christian missionaries and new materials introduced into the community by Islamic tradesmen. Provision of infrastructure and education after independence in 1960 improved the economy and technology, manifest in rectilinear compounds constructed entirely of hollow concrete blocks especially in urban towns. By the beginning of the 21st Century, the first generation of civil servants trained by missionaries and the government returned home on retirement, importing western style bungalows into the community as a reflection of current trends in many Nigerian urban centres. These findings support the first hypothesis regarding the passive role domestic built forms play in containing and reflecting changes within the cultural fabric of the community.

Throughout these transformations, built forms have conformed and adapted to changing trends in the lifestyle of community residents while retaining some salient aspects of the culture. The sustained use of basic spaces notably open courtyards and forecourts for day-to-day household activities is an example. Space syntax analyses of floor plans obtained from the measured survey confirm the courtyard as the most integrated space for 80% of compounds in the sample. Deviations from this pattern are associated with compounds accommodating small nuclear families, reminiscent of starter families in traditional times. Results from space syntax analyses and compound transformation patterns suggest that architecture plays an active role in maintaining certain cultural traditions and resisting change within the built environment, supporting the second hypothesis. Specifically, location, access and the use of space within compounds were seen to have remained constant. These are influenced by socio-cultural factors of kinship, security, gender roles and basic needs. The preference for concrete as a building material based on gender roles and social status was seen to be an emerging socio-cultural factor influencing house form and residential structure. Findings above address the fourth research question regarding factors and themes

sustained throughout the transformation process as well as highlight theories regarding the complex relationship between architecture and culture in the study area.

Chapter Seven tests the deployment of these theories in practice by comparing spatial/morphological characteristics and space use patterns from community-produced housing and two sets of prototype units provided by government in the community. The latter were either abandoned or modified. Results suggest that active agents of cultural resistance in the form of socio-cultural factors of kinship, security and basic needs were inadequately reflected in the location and design of the prototype units to account for their abandonment and modification.

Findings from the foregoing paragraphs were useful in providing an ethnographic qualitative account of the worldview and culture of the Tangale community, which formed the basis of generating possible theories regarding architecture and dynamic culture based on methods from anthropology and sociology. These were then tested using quantitative methods from architecture and behavioural studies in Chapters Six and Seven, linking theory to practice.

Combining methods from several distinct disciplines, though profitable as illustrated, was not without complexities and problems. Conducting fieldwork that employed all the above approaches presents several areas architects working along similar lines in future need to consider.

8.2 Reflections on the methodology and fieldwork

As re-iterated in Chapter Three, approaches to the study of vernacular architecture and contemporary housing studies frequently present researchers in the field with complex problems that increasingly necessitate adopting interdisciplinary approaches. In studying the Tangale community and its related housing problems, I faced difficulties in certain areas largely due to the short time

frame I had to collect data, insecurity in the North East region, the lack of formal training in interdisciplinary methods and issues with space syntax software programmed along western standards of space use.

8.2.1 Limited time frame for an extensive study

This study approached the housing problem in Tangale land in three ways-the lack of architectural research, the relationship between socially related ills and changes in the built environment and abandonment/modification of prototype units. Addressing this broad scope necessitated conducting two different surveys within the time frame allotted for a Ph.D, which traditionally is three years. In reality, this was not an easy task to accomplish. The practicalities of obtaining ethical approval for the surveys, arranging transportation and other logistics such as internet connectivity for communication with my supervisors while in the field, identifying key informants, making initial contacts with CHs, re-scheduling meetings and appointments with several households within a total period of seven months was daunting at times. Keeping to a tight schedule with deadlines proved beneficial in this regard. In retrospect, such a study should have been conducted piecemeal, in stages, some to be continued after the doctorate programme.

8.2.2 Insecurity and insurgency in the North East region

Conducting interviews during a period of escalating insecurity and insurgency in the North East was often psychologically and physically distressing. Fully armed military personnel at several checkpoints man most federal highways such as the A345 passing through Billiri. Journeys on such roads therefore took longer periods than were necessary. I frequently had to travel to Gombe, the state capital 56km away for supplies during the fieldwork. These circumstances were unfortunately, unavoidable.

8.2.3 Inadequate formal training in interdisciplinary approaches

The lack of formal training in interdisciplinary approaches especially in anthropological fieldwork and reporting was intellectually challenging. Most of the information and training I received came by way of graduate courses ran by the Postgraduate School at the University of Nottingham and from other materials such as books and published papers in the individual fields¹¹³. This is an area the curriculum followed by many Nigerian schools of architecture needs evaluation. Ideally, these are techniques and skills an architect can imbibe and improve upon while still in training as part of undergraduate or graduate coursework. This is perhaps most evident in the style of reporting ethnography, which as an architect, I was ill equipped for. Similarly, space syntax is a specialist application within architecture and I had to learn the workings of the analysis within the limited time frame.

In line with these observations, several architect-educators and practitioners have observed deficiencies in the curricula of architectural education in Nigeria and have subsequently called for its review to address issues relating developments in science and technology as well as reflect societal aspirations and meet socio-cultural and economic needs (Emma-Ochu, 2009). "Architecture education should provide a balance between practicalities of the studio design and the acquisition of culture based behavioural knowledge which enables students to relate properly to the society and environment" (Udeh 1990:24). Emma-Ochu (2009) submits one of the main weaknesses of the current curricula in most Nigerian schools of architecture is the absence of vital areas of study which are of great importance to enhancing the ability of the architect to respond to societal needs and peculiarities. Experiences accruing from this study strongly support these observations and underscore the need for formal

¹¹³ Spradley (1979), Spradley and McCurdy (2009) offer practical advice on fieldwork with good examples of ethnographical reporting.

incorporation of methods from allied disciplines of the built environment notably anthropology, sociology and behavioural studies.

8.2.4 Space syntax software programmed along western standards of space use

Depthmap™ version 10, the software developed by Space Syntax Laboratories at the University College London was employed in analysing floor plans of compounds obtained from the measured survey. To test the validity of the method, integration values of the first fifteen compounds, a third of the sample, were manually calculated based on the procedure enumerated on pp. 69-71. These values were then compared to results obtained by running a similar procedure in Depthmap™. These were found to be accurate to 4 significant figures.

This process however revealed that the convex tool encompassed areas within another spaces. This is the tool employed to draw the outlines or boundaries of functional spaces on floor plans, which are then linked and analysed in Depthmap (refer to *Figures 3.4-7* for this procedure). In this sample, bungalows located in the middle of compounds were taken as one entity by the software (*Figure 8.1*). Creating a break within the courtyard convex space resolved the problem (*Figure 8.2*). This probably occurred because the software may have been programmed to analyse discrete spaces as commonly found in western designs. Non-western spatial layouts illustrated by some Tangale compounds may not always follow this pattern. Notwithstanding, the software proved to be an accurate and valuable tool for simplifying what would have otherwise been a cumbersome task in calculating integration values employed in the study.

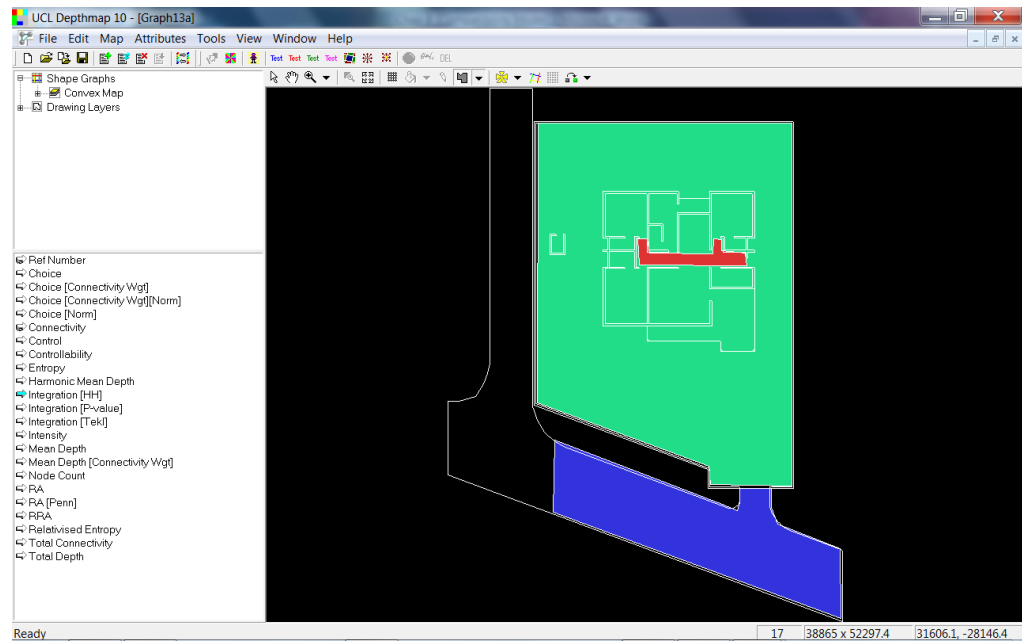


Figure. 8.1: Depthmap™ v 10 analysis showing no break in the courtyard convex space of compound 44

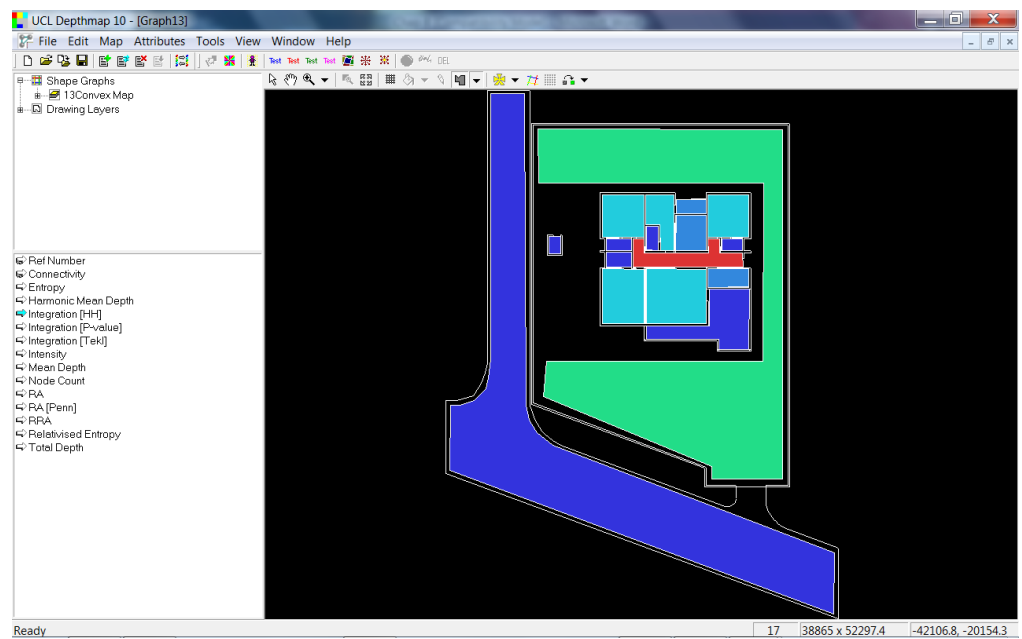


Figure. 8.2: Depthmap™ v 10 analysis showing break in the courtyard convex space for the same compound illustrated above

Other observations regarding the strengths, weaknesses, opportunities and threats to employing interdisciplinary approaches for the present study are summarized in Table 8.1.

Table 8.1: *SWOT analysis combining methodologies from four disciplines in the study area*

Parameters	INTERNAL QUALITIES (From methods)		EXTERNAL INFLUENCES (From the field)	
	Strengths	Weaknesses	Opportunities	Threats
CHAPTER FIVE: Tangale Ethnography (from anthropology and sociology)	<ol style="list-style-type: none"> 1. Inductive nature of approach suited to investigating the Tangale culture 2. Exploratory broad approach uncovered many salient features of the culture 3. Good for generation of theories in the built environment 4. Provided an overview and explanation of events and how these influenced the lifestyle of the community 	<ol style="list-style-type: none"> 1. Too broad in scope 2. Non specific exploratory nature 3. Subjective results, dependent on researcher's understanding and interpretation of phenomena 	<ol style="list-style-type: none"> 1. New uncharted area, where little architectural research has been conducted 2. Good prospects of generating new data 3. Responsive cooperative residents 4. Easy access to informants 5. Open nature of outdoor living easy to observe by an outsider 	<ol style="list-style-type: none"> 1. Insecure region 2. Poor infrastructure and access to quality accommodation, clean water and steady power supply 3. Dusty and uncomfortable climatic conditions towards the end of the year at harvest time
CHAPTER SIX: Housing in Tangale land: typologies and space syntax analysis (from architecture and behavioural studies)	<ol style="list-style-type: none"> 1. Specific narrow scope 2. Deductive nature suited to test identified theories 3. Precise quantitative data obtained from scaled measured drawings, space syntax analyses and interview transcripts 4. Replicable and objective approach with the possibility of obtaining similar results 5. Offered a good strategy of establishing theories in the study area 	<ol style="list-style-type: none"> 1. Physical measurements and interviews requires effort and time 2. Space syntax analysis requires specialist training 3. Non robust nature of space use data based on general descriptions by respondents and observations by the researcher 	<ol style="list-style-type: none"> 1. Good cooperation and help from residents during measured survey 2. Easier documentation of simple built forms and spatial organization of spaces within compounds 3. Formation of good social network and learning from informants 4. Access to cheap fresh food and transportation costs 	<ol style="list-style-type: none"> 1. Difficulty in residents filling out time diaries for space use 2. Poor road network for many villages 3. Time lost in repeated visits due to unstructured nature of life for many compounds and households
CHAPTER SEVEN: Prototype housing (from architecture and behavioural studies)	<ol style="list-style-type: none"> 1. Specific aim 2. Objective results 3. Suited for testing link between theory and practice 4. Replicable methods 5. Precise original data generated 6. Results beneficial for aspects of future policies in urban planning and architectural design 	<ol style="list-style-type: none"> 1. Few samples of 2nd prototype to arrive at a definite conclusion 2. No time available for feedback from the community on results obtained and recommendations to be proffered 	<ol style="list-style-type: none"> 1. Presence of abandoned and modified prototype units provides evidence of inadequacy of public housing delivery 2. Easy access to units due to their proximity to the A345 highway 3. No official permission required, saved time 4. Easy access to opinions of community residents about the abandoned state of units 	<ol style="list-style-type: none"> 1. Unsafe and insecure environment, abandoned area, no close neighbours, prone to delinquents, reptiles 2. Poor and weakened condition of the units a high risk for taking physical measurements

A SWOT analysis of the four disciplines employed in addressing housing related problems in Tangale land illustrates that strengths and opportunities inherent in the methods and field outweigh their weaknesses and threats. Importantly, strengths of one approach often mitigated weaknesses inherent in another technique. For instance, the objective nature of space syntax analysis, data from measured drawings and responses from interview responses in Chapter Six counteracted the subjective nature of observations made in Chapter Five on Tangale ethnography. Similarly, the broad narrative nature of the first survey reported in Chapter Five contrasts with the precise narrow scope of the second survey reported in Chapters Six and Seven. The time expended in locating initial key informants was redeemed by easier access to more informants later on during the fieldwork. The inconvenience of poor infrastructure and inadequate power supply was offset by cheap transportation and feeding costs while problems related to risks in taking physical measurements were reduced by the cooperation of most residents and the relatively simple building forms and spatial organization of many Tangale compounds. While this may not always be the case if similar studies were to be conducted in different locations, the experience garnered from this research illustrates the wealth of information that can be obtained by carefully combining methods from allied disciplines in the built environment in response to addressing housing needs of indigenous communities.

8.3 Towards a cultural anthropology of architecture, a revised framework for vernacular studies

The discussion from the foregoing paragraphs supports the argument for an anthropology of architecture especially regarding vernacular built forms in dynamic and changing cultures. Towards this end, the framework from existing approaches discussed in Chapter Three, *Figure 3.1* was revised to reflect the experiences gained from the present study. This is illustrated in *Figure 8.3*.

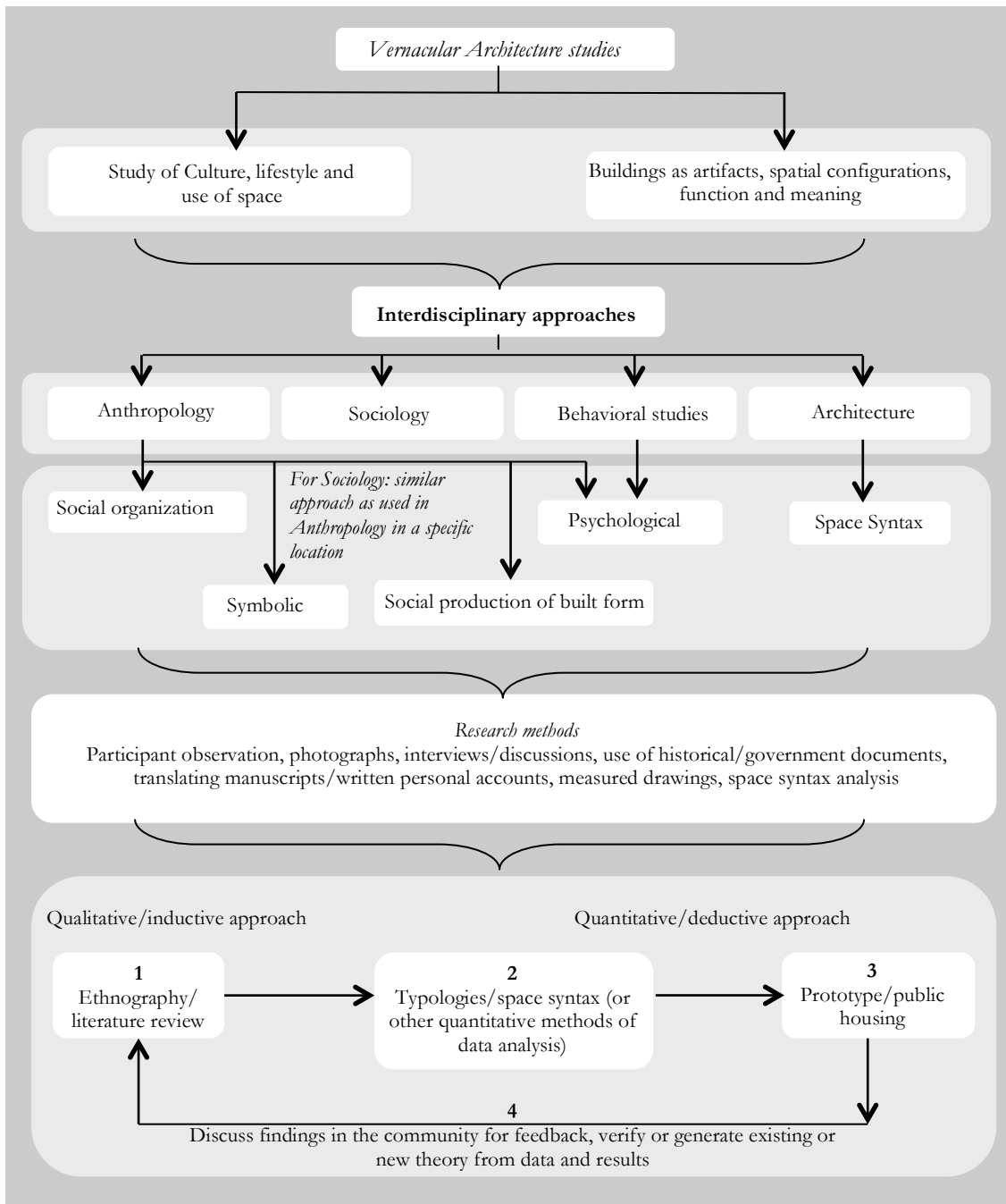


Figure 8.3: *Revised framework for vernacular architecture studies*

Research methods from the allied fields of anthropology, sociology, behavioural studies and architecture were combined in this framework. Participant observation interviews, focus group discussions, the use of photographs, sketches, historical documents and personal accounts of informants were employed in establishing the worldview, lifestyle, values and cultural character of the Tangale community (Stage 1). This may not be the case where

such information already exists for other communities, as illustrated by the Literature Review. Prior studies in this regard utilized already documented cultural features of the communities researched especially in Nigeria. For such cases, a thorough review of the existing literature in order to understand the links between culture and built forms will be valuable in order to generate possible theories and ideas which can then be tested quantitatively as illustrated in Stages 2 and 3. Fien et al. (2008) adopted this approach as described in Chapter Three.¹¹⁴ For this study, measured drawings documenting the housing situation in the community and space syntax analysis as well as interview responses were employed to test ideas and theories raised from the ethnographic survey. Other methods could be utilized in this regard depending on the aims and research questions postulated at the beginning of a study. An important step involves obtaining feedback from the community regarding results obtained from the study as well as possible recommendations to be proffered (Stage 4). This ensures that research thoroughly reflects the needs and aspirations of the people it is expected to serve.

Additionally, results obtained from testing theories and observations from the field via ethnography or a review of literature may open up other avenues or raise questions for further research as illustrated in the fourth stage of *Figure 8.3*. For instance, the characteristics of housing and compound transformations, space syntax analyses and observations of space use were tested on one clan in this study. These need to be investigated further in the remaining clans. The role of women as CHs and their decision-making processes were highlighted in Chapter Six but not expounded upon. Furthermore, this study focused on socio-cultural facets and spatial morphology of Tangale domestic spaces. Environmental factors and materiality, which may play an equally important role in influencing house form and residential structure, are yet to be investigated. Traditional practices

¹¹⁴ Refer to pp. 64-65

under threat such as building skills and dwindling farmlands due to the urbanization process also need detailed research as these present possibilities for stemming migration, improving the economy and providing employment, all of which were highlighted as factors fostering the increase in delinquency and insecurity observed in the community. A review of literature and research on these and other issues emanating from the study would add value to the overall results and recommendations to be eventually adopted for the community.

8.4 Conclusions

A summary of key findings from this study was presented which linked changes largely due to external factors to changes in housing typologies and the built environment via an ethnographic survey. Results from a measured survey were instrumental in proffering findings relating to future developments in urban planning and architectural design, linking theory to practice. The study also highlighted the gains as well as impediments to employing interdisciplinary approaches for addressing housing related problems in urbanizing indigenous communities.

In conclusion, the discussions above underscore two important issues-the role architects can play in identifying links between dynamic changes in culture and developments in the built environment and the current state of architecture both as a reflector of culture and as a mechanism of resistance. Firstly, as leading professionals in the building industry, architects are better positioned to generate appropriate theories that link theory to practice. Unfortunately, the architectural curriculum in many Nigerian schools of architecture rarely prepares architects for such an interdisciplinary task as this study has shown. This is an area that needs further development in light of the projected rise in the Nigerian population, which will necessitate more housing units in the near future. Secondly, due to the dynamic nature of culture and effects of urbanism, residential structures in the

built environment of Tangale land express architecture as both a passive container of culture and an active mechanism of cultural resistance. This tension is dynamically balanced in many community-produced compounds as illustrated in the four housing typologies presented in Chapter Six. Many compounds combine features of modern trends such as function specific spaces, bungalow designs and the use of concrete materials and forms whilst retaining traditional courtyards, verandas, several sleeping rooms and forecourts as well as being located within occupied clan lands. Government provided housing have not fared so well in this regard from findings presented in Chapter Seven. The abandoned units were located out of occupied clan lands in areas considered insecure by residents, contained a single bedroom and lacked a courtyard. The second set of prototype units contained two different buildings and spaces considered atypical within the community. Residents of the modified prototype unit linked the two buildings with a courtyard as obtained in community-produced compounds whilst converting some of the spaces to accommodate their basic needs. In order to reduce problems relating to abandonment and modifications, future public housing designs need to reflect the balance between traditional values/needs and changing cultural trends.

8.5 Recommendations

Recommendations accruing from this study fall under four main categories. These include the possibility of formally incorporating interdisciplinary methodologies in architectural training, consideration for passive and active agents of architecture in future public housing schemes and community intervention for reviving the economy in the study area as well as improvement of space syntax software for analysing non-western configurations.

8.5.1 Incorporating interdisciplinary methods in the curriculum for Nigerian schools of architecture

As re-iterated in the foregoing sections, architects play a huge role in shaping the built environment. This is frequently becoming the norm even in indigenous communities where residents traditionally design and construct their dwellings. It is expedient therefore, that architects become actively involved in learning ways traditional communities build as a prelude to designing culturally sustainable housing. A strategy towards achieving this broad overarching aim is to actively incorporate interdisciplinary methodologies from other allied disciplines of the built environment such as anthropology, sociology and behavioural studies in training future Nigerian architects. This has the potential of imbibing a culture of interdisciplinary research in the early stages of their careers. This would be a huge benefit to the practice of architecture in general and housing in particular.

8.5.2 Design recommendations for future policies in urban planning and architectural design

As presented at the end of Chapter Seven, future urban planning of residential areas will benefit from locating such around occupied clan lands for security and social network. Additionally, designs for housing units need to carefully consider the spatial organisation of basic spaces notably courtyards, verandas, forecourts, sleeping rooms and service spaces. Well-utilised internal spaces such as sitting rooms in the latest bungalow typology should be designed for easy access to verandas and courtyards. Together, these parameters were shown to comfortably support the day-to-day activities of many Tangale households. These considerations should be borne in mind by any architect whose duty it is to design houses for private clients or the public in the community.

The use of open courtyards in Tangale land is closely associated with the community's way of life and may continue to do so in the foreseeable future. This should be taken into account in urban development, particularly in the area of land allocation especially for residential areas. Using the sample surveyed, the average size of a plot for any given compound can be obtained once the space need in terms of area for a household is known. Generally the trend from the study is plot size equals entire compound area. It follows that ideal plot size is a function of built up area and courtyard area. If ideal plot size = built up spaces, $x_{bt \text{ space}}$ + open courtyard area, y_{ct} , a relationship or simple linear regression can be established between built up space and approximate courtyard space using the line of best fit/least squares equation using areas from *Appendix 16*.

$y = a + bx^{115}$, where y is estimated open courtyard space in m^2 ;

x is approximated built up space from household requirements;

a is the constant and b coefficient of x .

$$\sum Y = \sum a + \sum bX \dots (i),$$

$$\sum XY = \sum Xa + \sum X^2b \dots (ii)$$

Substituting figures from *Table 8.2*,

$$12369.81 = 45a + 7397.94b \dots (i)$$

$$222317 = 7397.94a + 2316205b \dots (ii)$$

$$\text{Multiplying (i) by } 164.4, 2033596.764 = 7397.94a + 1216211472b \dots (iii)$$

$$\text{Subtracting (ii) from (iii), } 189720.236 = 1099993.528b; b = 0.172$$

$$\text{Substituting } b \text{ in (i); } 12369.81 = 45a + 7397.94(0.172); a = 246$$

Therefore, the relationship between y_{ct} and $x_{bt \text{ space}}$ for this community can be estimated by the formulae $y_{ct} = 246.6 + 0.172 x_{bt \text{ space}}$. This can be used to estimate plot sizes in future for households in the community¹¹⁶.

¹¹⁵ The formulae for this section is based on material from Nelson (2010) p 27-57, 76-77.

¹¹⁶ Allowing for about 10% degree of error.

This quantitative method of determining plots for housing provision however needs to be applied in conjunction with a qualitative understanding of spatial needs and cultural patterns within the community.

Table 8.2: *Line of best fit for estimating plot sizes from surveyed compounds*

S/No	Built up space (m ²) X	Av. Size of courtyard (m ²) Y	XY	X ²	Y ²	\hat{Y} ($y=246.6+0.172x$)	$d=Y-\hat{Y}$	d^2
1	34	93.4	3175.6	1156	8723.56	252.448	-159.048	25296.27
2	127.3	142.7	18165.71	16205.29	20363.29	268.4956	-125.796	15824.53
3	62.3	364.7	22720.81	3881.29	133006.1	257.3156	107.3844	11531.41
4	139.2	56.1	7809.12	19376.64	3147.21	270.5424	-214.442	45985.54
5	54	333.6	18014.4	2916	111289	255.888	77.712	6039.155
6	176.7	326.85	57754.4	31222.89	106830.9	276.9924	49.8576	2485.78
7	102.5	113	11582.5	10506.25	12769	264.23	-151.23	22870.51
8	143.2	68	9737.6	20506.24	4624	271.2304	-203.23	41302.6
9	105.28	230.9	24309.15	11083.88	53314.81	264.70816	-33.8082	1142.992
10	155.4	77.85	12097.89	24149.16	6060.623	273.3288	-195.479	38211.96
11	89.8	65.88	5916.024	8064.04	4340.174	262.0456	-196.166	38480.94
12	74.8	299	22365.2	5595.04	89401	259.4656	39.5344	1562.969
13	121.6	82.9	10080.64	14786.56	6872.41	267.5152	-184.615	34082.77
14	68.4	230	15732	4678.56	52900	258.3648	-28.3648	804.5619
15	46.15	128.7	5939.505	2129.823	16563.69	254.5378	-125.838	15835.15
16	167.4	618.6	103553.6	28022.76	382666	275.3928	343.2072	117791.2
17	91.9	345	31705.5	8445.61	119025	262.4068	82.5932	6821.637
18	213.86	128.4	27459.62	45736.1	16486.56	283.38392	-154.984	24020.02
19	1079.85	307	331514	1166076	94249	432.3342	-125.334	15708.66
20	74.3	187.6	13938.68	5520.49	35193.76	259.3796	-71.7796	5152.311
21	126.1	297.8	37552.58	15901.21	88684.84	268.2892	29.5108	870.8873
22	284.2	65	18473	80769.64	4225	295.4824	-230.482	53122.14
23	101.4	62.35	6322.29	10281.96	3887.523	264.0408	-201.691	40679.18
24	277.2	771.8	213943	76839.84	595675.2	294.2784	477.5216	228026.9
25	102.7	198.65	20401.36	10547.29	39461.82	264.2644	-65.6144	4305.249
26	60.4	297.9	17993.16	3648.16	88744.41	256.9888	40.9112	1673.726
27	126.6	272	34435.2	16027.56	73984	268.3752	3.6248	13.13918
28	133.9	179.5	24035.05	17929.21	32220.25	269.6308	-90.1308	8123.561
29	87.85	557.6	48985.16	7717.623	310917.8	261.7102	295.8898	87550.77
30	168.1	120.5	20256.05	28257.61	14520.25	275.5132	-155.013	24029.09
31	73.4	118.5	8697.9	5387.56	14042.25	259.2248	-140.725	19803.47
32	148.6	241.55	35894.33	22081.96	58346.4	272.1592	-30.6092	936.9231
33	208	151.5	31512	43264	22952.25	282.376	-130.876	17128.53
34	163.7	241	39451.7	26797.69	58081	274.7564	-33.7564	1139.495
35	293.8	333	97835.4	86318.44	110889	297.1336	35.8664	1286.399
36	190.9	142.7	27241.43	36442.81	20363.29	279.4348	-136.735	18696.41
37	151.75	808.25	122651.9	23028.06	653268.1	272.701	535.549	286812.7
38	372.3	364.7	135777.8	138607.3	133006.1	310.6356	54.0644	2922.959
39	267.4	162.6	43479.24	71502.76	26438.76	292.5928	-129.993	16898.13
40	75	394.5	29587.5	5625	155630.3	259.5	135	18225
41	183.66	728	133704.5	33731	529984	278.18952	449.8105	202329.5
42	200.27	646.43	129460.5	40108.07	417871.7	281.04644	365.3836	133505.1
43	150.4	251.5	37825.6	22620.16	63252.25	272.4688	-20.9688	439.6906
44	234.5	595	139527.5	54990.25	354025	286.934	308.066	94904.66
45	87.87	167.3	14700.65	7721.137	27989.29	261.71364	-94.4136	8913.935
Σ	7397.94	12369.8	2223317	2316205	5176287	~0	~0	1743289

8.5.3 Broader contextual issues: reviving traditional skills and values

From discussions on changes in the lifestyle of the community in Chapter Five, government intervention paved way for the provision of infrastructure such as roads, electricity, free education etc in urban areas encouraged migration for majority of people seeking a better life for themselves and their families. This is a phenomenon generally associated with insecurity, crime, slums and unhealthy environments in many parts of Nigeria and the world (Olotuah and Adesiji, 2005a). A way of stemming this trend will involve spreading infrastructural development across all clan lands, instead of having them concentrated in Billiri within Tangaltong clan. This will improve environmental conditions in other clan towns and encourage community re-engagement to farming within clan areas instead of migrating to the LG headquarters in search of greener pastures. Although the study reports all CHs were involved in farming, several CHs reported carrying this out in a non-commercial capacity to provide food for their households and to maintain inherited farmland. Agriculture needs to be encouraged in the community not only for local consumption for also for export. This is timely in light of the forecast of food crisis in the West African region (Ahmad, 2012). Agriculture will also help to reduce unemployment (Abutu 2012, Kajo 2012), which contributes to insecurity. “Unemployment in Nigeria is therefore a widening time bomb which if not detonated through a controlled process of comprehensive transformation of the collapsed socio-economic infrastructure could result in so much grave social dislocation in the coming years” (Onwubiko, 2011). Additionally, the custom of transferring building skills via construction of huts illustrated in *Plates 5.47-49, 5.55-72* is gradually facing extinction, as explained by the head of compound 1. Building with hollow concrete

blocks introduced into the community has not received equal attention, observed a mason in the community.

"Building with concrete blocks requires precision and training, which many young men are impatient to learn from their peers and other young builders. Importantly, they are lured into looking out for easier white-collar jobs as they believe it fetches quicker money. Only my brothers and cousins are involved in our business outfit. Another contributing factor is that jobs are not as regular as one would expect, most of our clients are workers and civil servants in urban towns and cities who want to build a bungalow at home in order to have a place to stay when they come home annually at Christmas or Easter. This trend is gradually changing as more and more people resident at home are beginning to build houses with concrete blocks".

The recommendations proffered in this section, though far from being exhaustive, accrue from field observations, interviews and an initial understanding of issues relating to the built environment of the Tangale community garnered through interdisciplinary approaches and in line with arguments for the anthropologist's role as an agent of change. "Heightened reflexivity is a pre-condition to using our insights, knowledge and skill in attempting to guide change in what appear to be more positive directions, however modest and small scale and despite the potential pitfalls. For some, this must include direct advocacy" (Kellet 2009:29). The architect, by employing interdisciplinary techniques in fieldwork is often better positioned to champion the cause for positive changes in matters relating to the built environment. In this regard, the observations on farming, building skills and proposals on plot allocation need to be further refined as highlighted in *Figure 8.3* through discussions and collaborations with clan leaders and residents before they can be fully recommended. Community residents are often best positioned to note as well as make effective contributions on strategies that will eventually be beneficial and sustainable within the community.

8.5.4 Improving space syntax software for analysis of non-western configurations

Observations from analysing floor plans of compounds in the community revealed that the convex tool of the software failed to adequately recognize spaces encompassed within another space, as often is the case with some non-western configurations. In this sample, a bungalow within a courtyard was taken as a single entity. Breaking this space as illustrated in *Figure 8.2* produced the desired result and correct integration values. This is an area in need of improvement.

8.6 Original contributions of the research to knowledge

- 8.6.1 Documentation of the ethnography of the Tangale community (Chapter Five).
- 8.6.2 Documentation of the existing housing situation in the community using the sample population (Chapter Six).
- 8.6.3 Identification of housing typologies in the community (Chapter Six).
- 8.6.4 Classification of compound transformation patterns and implications on future housing trends in the community (Chapter Six).
- 8.6.5 Identification of the socio-cultural factors influencing housing in the community (Chapter Six).
- 8.6.6 Analysing two sets of public housing in the community with suggestions for reasons behind their abandonment or modification (Chapter Seven).
- 8.6.7 Formulation of an interdisciplinary framework for vernacular studies aimed at unearthing architectural data on housing, which can be replicated to achieve similar results for other indigenous cultures in the region and beyond (Chapter Eight).

8.7 Areas for further research

8.7.1 Testing the framework in other clans of the community

The framework for this study was tested on one out of seven clans in Tangale land. Testing this on other clans will ensure more grounded conclusions on housing and spatial morphology of Tangale compounds. Additionally, the compounds were spatially analysed using thematic historic events recorded in the community. Analysing them to ascertain if they fit other categories established in literature such as introverted or extroverted spatial layouts will add depth to the study. Further analysis using axial and isovist techniques from space syntax may also elicit other characteristics and possible effects of views and arrangement of openings not evident from the present analysis.

8.7.2 Need for similar studies in other cultures of North East Nigeria

Research in cultures with similar backgrounds to unearth useful information for future planning of built environments in such communities is equally important. "Attitudes towards space use and organization are all linked to cultural traditions which are often best understood by the local people" (Olotuah and Adesiji 2005a: 8-9). Consequently, culture specific research should be pursued to not only document rapidly changing vernacular environments but also to analyse phenomena responsible for changes towards a better understanding of future trends in such communities. This is imperative if housing policies are to adequately reflect the needs of people they are meant to serve.

8.7.3 Need for an archaeological study of the Tangale hills

Observations made on Tangale traditional architecture and way of life in Chapter Five will greatly benefit from a study of material remains of compounds on the Tangale hills, which have remained largely uncharted by way of intense research. It also has the potential of establishing dates

and time frames to the early settlement pattern of the seven clans described in Chapter Five. This is intricately related to how the community constructs place and its link to the past. “If we can accept the analogy of architecture as a receptacle of a community’s knowledge and actions, then the retention of sites of memory represents a healthy validation or acknowledgement of this past” (Hanks and Brown 2012:218). This is valuable as “a way of constructively incorporating past architecture meaningfully within the present, whilst allowing for future occupations” (Hanks and Brown 2012:218-219). Other hill tribes in the region such as the *Muri* have benefitted from similar efforts (Adelberger 2009). This is long overdue and well beyond the scope of this work.



Plate 8.1: Remains of stone foundation of a hut on the Tangale hills. Source: Fieldwork, January 2011



Plate 8.2: Material remains of a compound on the hills. Source: Fieldwork, January 2011



Plate 8.3: Part of the Tangale hill range seen from Kufai. Source: Fieldwork, January 2011



Plate 8.4: Tangale hills. Source: Fieldwork, January 2011

8.7.4 Need for Environmental research and analyses in the study area

This study presented the socio-cultural and spatial aspects of Tangale domestic architecture. Studies which explore relationships between environmental factors, climate and materiality will be beneficial for eliciting information on how these influence the use of open courtyards and verandas in the community. This has the potential of enriching the database for future policies in housing for the Tangale community.

8.7.5 Gender roles and how this influences decision-making

The study briefly highlighted the changing role of women as compound heads. The role women play in decision-making regarding housing and the built environment in Nigeria is an area that needs further studies as advocated by several authors (Uji 1999, Asiyanbola 2012a, 2012b, 2013, Oriye et al. 2012). This is important because many women are becoming economically empowered. How this influences decisions relating to housing and the built environment is however yet to be empirically explored in many parts of Nigeria, especially within the North East region.

APPENDICES

APPENDIX 1: Ethical approval for the surveys



Ethics Committee Reviewer Decision

This form must be completed by each reviewer. Each application will be reviewed by two members of the ethics committee. Reviews may be completed electronically and sent to the Faculty ethics administrator (Richard Adams) from a University of Nottingham email address, or may be completed in paper form and delivered to the Faculty of Engineering Research Office.

Applicant's full name: Joy Joshua Maina

Application ID: 2011-67

Reviewed by:

Name: Robert Houghton & John Wilson Date:02/09/11

Signature (paper based only)

- ☒ Approval awarded - no changes required
- ☐ Approval awarded - subject to required changes (see comments below)
- ☐ Approval pending - further information & resubmission required (see comments)
- ☐ Approval declined – reasons given below

Comments:

Consent forms to be stored separately from research materials.

Data to be retained for seven years (this is generally a requirement of most journals I think).

Please note:

1. The approval only covers the participants and trials specified on the form and further approval must be requested for any repetition or extension to the investigation.
2. The approval covers the ethical requirements for the techniques and procedures described in the protocol but does not replace a safety or risk assessment.
3. Approval is not intended to convey any judgement on the quality of the research, experimental design or techniques.
4. Normally, all queries raised by reviewers should be addressed. In the case of conflicting or incomplete views, the ethics committee chair will review the comments and relay these to the applicant via email. All email correspondence related to the application must be copied to the Faculty research ethics administrator.

Any problems which arise during the course of the investigation must be reported to the Faculty Research Ethics Committee

APPENDIX 2: Information sheet for participants and consent forms



The University of
Nottingham

UNITED KINGDOM · CHINA · MALAYSIA

1. **Purpose of study:** This research aims at establishing socio-cultural factors which determine house form and residential structure in Tangale land, North-Eastern Nigeria. This is important in guiding the design and planning of future built environments that will better suit users of both public and private housing schemes.
2. **Who will be conducting the interview:** Joy Maina, PhD researcher, Department of Architecture and Built Environment, University of Nottingham.
3. **Sponsors:** The Nigerian Government through the Education Trust Fund (ETF) fellowship grant.
4. **Procedures:**
 - i) Reading, explanation and signing of the information sheet/consent form.
 - ii) Interviews using questionnaires (Appendix 3 and 4).
 - iii) For the 2nd survey: measurement of compound/house at a pre-arranged time convenient to the household selected.
5. **Hazards:** There is no known hazard associated with the interviews. However, care will be taken by the researcher and a trained assistant when taking physical measurements of individual compounds to minimize any risk of possible injury.

In the event of such occurring, an arrangement with the General Hospital in Billiri will be made for prompt medical attention and any bills accruing from medical care offset by the researcher.
6. **Benefits:** Information will be useful in the future planning of physical infrastructure for the Tangale community as well as serve as material which documents the architectural and ethnographical heritage of the community.
7. **Confidentiality/Anonymity:** No bio-data, photographs or video recordings of the participants will be made. Only the researcher will have access to the participants and others will not be able to identify the data with a participant. Data will be stored in locked and secure files within the school, handled by the researcher and supervisors.
8. **Data storage:** The data will be processed and presented in the form of tables, graphs and CAD drawings. Information accruing from the study will be disseminated via a research thesis, peer reviewed publications and at conferences.
9. **Contact:** In the case of queries or problems pertaining to the research, contact Joy Maina, Department of Architecture and Built Environment, University of Nottingham, University Park, NG7 2RD, Nottingham, United Kingdom. Mobile: +447901146927.

- 10. Voluntary participation:** Participation is voluntary and participants are free to withdraw from the study at any time. *In the likelihood a participant opts to leave, all data collected from such persons will be destroyed and NOT used for any reason in this or any other study.*



INFORMED CONSENT FORM

ID no. _____

Please tick as appropriate

- ☐ I have read the information provided by the researcher pertaining the study and agree to the terms stated.
- ☐ I understand that I am able to leave the study at any time.

Signature of participant

Date

APPENDIX 3: 1st survey questionnaire

Participant's ID no.	Opinion on the following:	
User Lifestyle	Education	Adults
		Children
	Employment/Income	
	Economy	Commercial outlets, markets
		Transport
	Family type, cycle	
	Kinship and residence	
	Social structure	
	Social amenities (TV, internet, telephone)	
	Infrastructure (Roads, electricity, pipe borne water)	
	Religion and beliefs	Mode of worship
		Places of worship
	Housing and spatial organization	
	Gender roles	Men
		Women
	Play, recreation and leisure	Type
		Where
		When
	Rites and ceremonies	Type
		Where
		When
	Values and Norms	
	Language	
	Political Organization	
Symbolism		
Transmission of traditions and local knowledge/crafts		
Effects of Urbanization and technology		
Influence of other Cultures	British colonial masters, American missionaries	
	Hausa traders	
	Neighbouring tribes	
Use of Space	Domestic routine	Weekdays
		Weekends
	Food and preparation	
	Activities and settings	

APPENDIX 4: 2nd survey questionnaire

(To be accompanied by measured surveys of selected households). *Responses to be filled in by the researcher.*

Participant's ID number.....

SECTION ONE: USER LIFESTYLE**A. EDUCATIONAL BACKGROUND**

1. Compound head ☐ Post Sec. ☐ Secondary Sch. ☐ Primary Sch.
☐ Other
2. Children ☐ Post Sec. ☐ Secondary Sch. ☐ Primary Sch.
☐ Other
3. Location of schools Post Sec.....Secondary Sch.....
 Primary Sch.....Other.....

B. EMPLOYMENT/INCOME

4. Occupation/trade, other sources of income

5. How many of the men in this household also do other work/trade besides farming?
 What are they?.....
6. Grade, rank or level of business.....

C. FAMILY TYPE

7. How many people living in the compound are related to you?
- a) Wife(s).....
- b) Children
- c) Brothers.....
- d) Cousins.....
- e) In-laws.....
- f) Father/Mother/Uncles/Aunties
8. Those not related to you
- a) Friends..... b) Tenants..... c) Others.....

D. KINSHIP, RESIDENCE AND SOCIAL STRUCTURE

9. What is your relation to the neighbour to your
- a) Right.....
- b) Left.....

- c) Rear.....
- d) Front.....
- e) Entire community.....
10. Have you lived here all your life?
- If no, specify ☐ Another ward ☐ Outside the Clan areas ☐ Outside Billiri

11. How did you end up here?

E. RELIGION/BELIEF

12. ☐ Christianity ☐ Islam ☐ Traditionalist ☐ Other.....
13. Place of worship.....

F. SOCIAL AMENITIES

14. Access to: ☐ Hospital/healthcare ☐ TV ☐ Telephone/mobile ☐ Internet

SECTION TWO: USE OF SPACE

G. DOMESTIC ROUTINE

15. Weekdays.....
16. Weekends.....

H. ACTIVITIES AND SETTINGS

17. Where do you and other men spend most of your time in the house?
18. What of others?

Activity/Space used	Male	Female	Children
Receiving guests			
Cooking/food preparation			
Eating			
Sleeping/resting			
Others			

SECTION THREE: HOUSE FORM**I. OWNERSHIP**

19. Who established the compound?
20. When?Who owns it now?
21. How? ☐ Built ☐ Inherited ☐ Purchased ☐ Rented/loaned ☐ Borrowed/gift
22. Cost.....

J. CONSTRUCTION PROCESS AND TECHNIQUE

23. Was the house like this when it was constructed?
If no, then state its growth, starting with the earliest to the latest added part
.....
.....
.....
24. Who was involved in the construction?.....
25. How was this financed?.....
26. When were major changes undertaken? ☐ Recently (when)
☐ 5-10 years ☐ 10-20 years ☐ Over 20 years
27. How often is this house maintained?
☐ Regularly ☐ Occasionally ☐ When necessary
Give brief
details.....
.....
.....
28. How is it maintained?
☐ Individual effort ☐ Group effort ☐ Paid labor ☐ Other
29. How many men know anything about building or construction in this house?

K. USER PREFERENCES (For future planning)

30. If there are means, what changes would you make in the compound?
.....
.....
.....
31. Which part of Billiri do you think is the best place to live in?
Why?
32. Which part of Billiri do you think is the worst place to live in?
Why?
33. Given the chance, which part of Billiri would you prefer to live?

Interview questions for the wife of compound head

1. How many women live here?
2. Which clan are you from?
3. Were you brought up there?
4. Is it the same with other women in this house?
5. Do you have an occupation/work?..... Where?.....
6. Where do you and other women spend most of your time in the house?
7. What of others?

Activity/Space used	Male	Female	Children
Receiving guests			
Cooking/food preparation			
Eating			
Sleeping/resting			
Others			

8. What major changes would you like to see done in this house?
.....
.....
.....
9. Which part of Billiri do you think is the best place to live in?.....
Why?
10. Which part of Billiri do you think is the worst place to live in?

Why?

SECTION FOUR: SPATIAL CONFIGURATION

This involves taking physical measurements of the compounds which will be used along with space syntax analysis.

House ID Number.....Date.....Time of visit.....

- BASIC USE**
1. Residence ☐ Single family ☐ Multiple families
2. Work place (If yes, specify type of work)
3. Combined

STRUCTURE

1. Building material(s) ☐ Mud (without finish) ☐ Mud (with finish)
- ☐ Mud (with cement finish) ☐ Concrete ☐ Other.....
2. Roof type(s) ☐ Thatch ☐ Corrugated iron sheet ☐ Concrete
- ☐ Other.....
3. Number of rooms/Spaces: Ground floor.....1st floor.....Other.....
4. Services (type and number of toilets)
- ☐ Pit latrine ☐ WC ☐ Bucket ☐ Other.....

GENERAL

1. Area of compound
2. Open area.....
3. Number of courtyards.....
4. Average size of courtyard.....
5. Population of household.....
6. Average courtyard area per person.....
7. Total number of sleeping rooms.....
8. Average size of room.....
9. Average number of persons per room.....
10. Other observations
- Light.....
- Electrical supply.....
- Water supply.....
- Ventilation.....
- Waste disposal/drainage.....

Linkage to the compound: ☐ Laterite ☐ Footpath ☐ Tarred ☐ Other.....

APPENDIX 5: Tangale traditional names*

Male names		
Name	Clan	Family unit
<i>Yila (1st)</i> <i>Mela (2nd)</i> <i>Lamela (3rd)</i> <i>Molmela (4th)</i> <i>Lamolmela (5th)</i>	Tangaltong (Biliri + Bare)	<i>Miyem ma mai, Seu, Koltanga, Pokwara, Kantalim-Tai, Begle, Labwini, Keleng, Dongol, Lapandim-Pe, Kanthalim-Ting, Latuldwang, Latulkwakka, Lapandi Asile, Kantilang, Kalkulum, Lapandlong, Yagye, Komta, Long, Kwalkwali, Lakomta, Da'anta, Karyulu, Tongli, Barem-Tai, Omi, Ankali, Kalpelle</i>
	Kalmai	<i>Okra, Tulai, Baram, Kantilang, Kwipandi, Kalmeyim-Tai, Kuzol, Lafunong, Futuk</i>
	Banganje	<i>Komta, Komtakunjang, Sesser Oktai, Lambiga, Baganjeng-Tai, Kaller, Tulkata, Kalkunji, Kwaya Semdem, Kwaya kalapilanu, Kwaya kalaseder, Kamo, Yaudi</i>
	Tanglang	<i>Kampandi, Sarmoto, Seu, Tulkwane, Labanganje, Oktong, Nathe, Obi</i>
	Tal	<i>Ankarat, Beker, Buye, Dwale, Domburom, Kolong, Kujengbuye, Lapugo, Mwa, Nathe, Pawure Buye, Piding Kulong</i>
	Todi	<i>Oktal</i>
<i>Angkwala</i> <i>Molangkwala</i> <i>Lamolankwala</i>	Kalmai	<i>Kaltanko</i>
<i>Anteleng</i> <i>Molanteleng</i> <i>Laanteleng</i>	Kalmai	<i>Kanje</i>
<i>Nitte</i> <i>Nittiwa</i> <i>Lanittuwa</i>	Kalmai Tal	<i>Talum-Ting</i> <i>Posangye, Talduka, Puri, Layoke, Bessa, Toruma, Talpandi, Tiwa Buye</i>
<i>Nadiye</i> <i>Molandiye</i> <i>Lamolandiye</i>	Kalmai Tal	<i>Tal Kilang</i> <i>Kilang</i>
<i>Amboke</i> <i>Molamboke</i> <i>Lamolamboke</i>	Banganje	<i>Kandro</i>
<i>Kalto</i> <i>Malakalto</i> <i>Malto</i>	Banganje	<i>Kanje, Kwaya Konduk, Kwaya Runi</i>
<i>Ambore</i> <i>Molambore</i> <i>Lamolambore</i> <i>Mame</i> <i>Lamame</i>	Banganje Tanglang Tal	<i>Bore muto, Bore tulpilum, Bore Konjirong, Natte</i> <i>Labanganje</i> <i>Dwatang, Kalbore, Layalang</i>
<i>Angolmo</i> <i>Molangolmo</i> <i>Laangolmo</i>	Banganje	<i>Yaudi</i>
<i>Ankale</i> <i>Molankale</i> <i>Lamolankale</i>	Tanglang	<i>Kanje, Kwaya, Kalakulong, Kalaboti, Sakem</i>
<i>Ambore</i> <i>Molambore</i> <i>Lamolambore</i> <i>Lambore</i>	Todi	<i>Kise, Dongor, Layalang, Ladur, Piding Kulong</i>
<i>Kamni</i> <i>Molkamni</i> <i>Lamolkamni</i>	Todi	<i>Kumyege</i>
<i>Ankolmo</i> <i>Molankolmo</i>	Todi	<i>Kalkolmo</i>

*Adapted from Kure (1987) and Mela (2004)

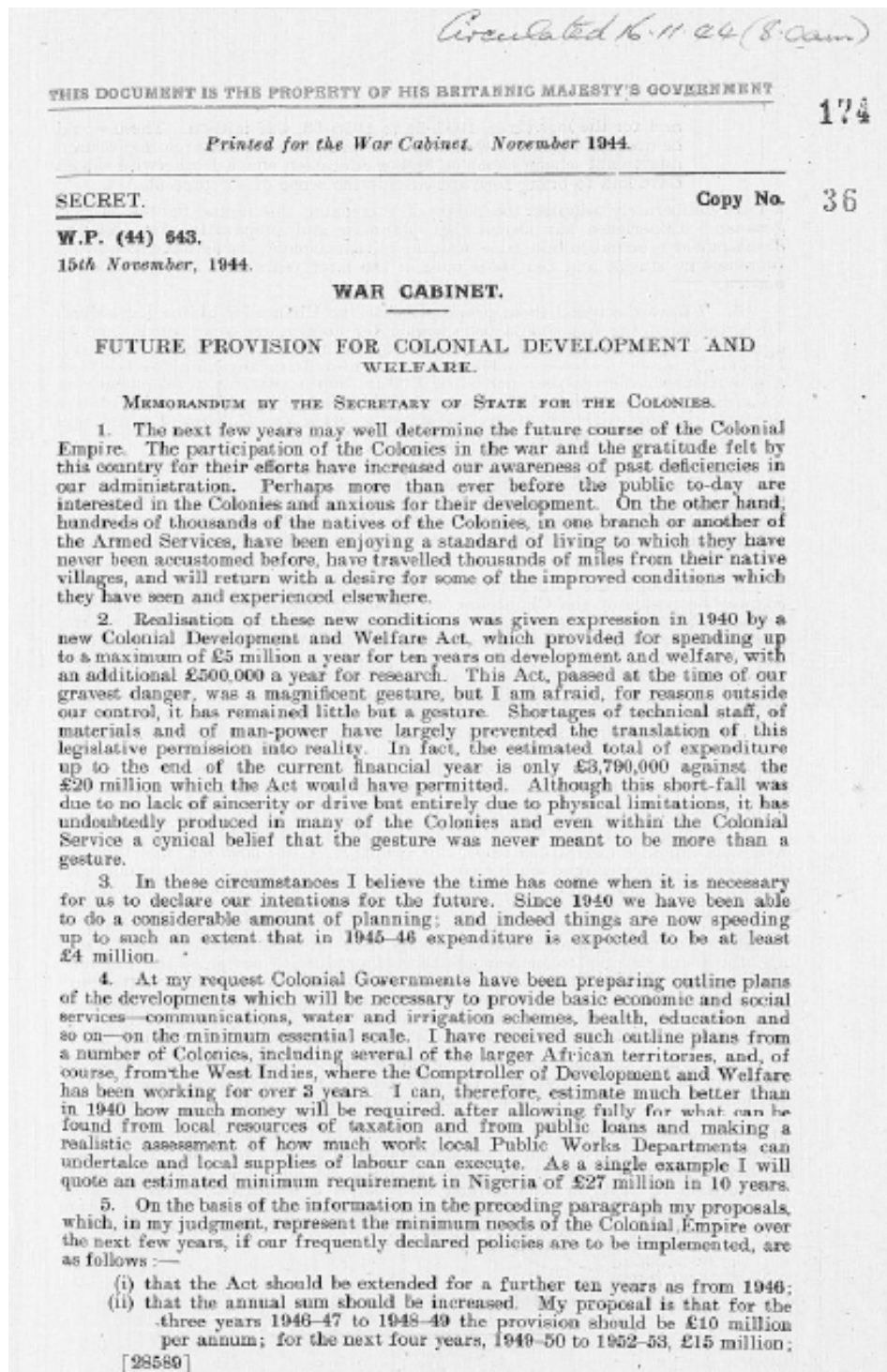
Female names		
<i>Name</i>	<i>Clan</i>	<i>Family unit</i>
Ballin (1 st) Mwalin (2 nd) Molyille (3 rd) Lamolyille (4 th) Alli (5 th)	Tangaltong (Biliri + Bare)	Miyem ma mai, Seu, Koltanga, Pokwara
Bome Malame Ibome Molbome Lamolbome	Tangaltong (Biliri + Bare)	Kantalim-Tai, Begle, Labwini, Keleng, Dongol, Lapandim-Pe, Kanthalim-Ting, Latuldwang, Da'anta, Barem-Tai, Omi, Ankali, Kalpelle
Asile Molasile Lamolasile	Tangaltong (Biliri + Bare)	Latulkwakka, Lapand Asile, Kantilang, Kalkulum
Lama Moluma Yiluma Layilma	Todi Tangaltong (Biliri + Bare)	Ok Tal Lapandlong, Long, Kwalkwali
Boh Molboh Lamolboh	Tangaltong (Biliri + Bare)	Yagye
Keltu Melentu Lamelentu Lakeltu	Tangaltong (Biliri + Bare)	Komta
Asiyo Malasiyo Lamalasiyo Paran Laparan	Tanglang Tangaltong (Biliri + Bare)	Sarmoto, Seu, Tulkwane, Komta Lakomta
Yuru Molyuru	Tangaltong (Biliri + Bare)	Karyulu
Kulong Molkulong Lamolkulong Lamomo	Tangaltong (Biliri + Bare) Tanglang Tal Todi	Tongli Kalkulong Ankarat Piding Kulong
Kalya Molkalya Lamolkalya Molkalya	Kalmai	Okra, Tulai, Baram, Kalmeyim-Tai, Kuzol, Lafunong, Futuk
Pali Molpali Lamolpali Lapali La'apa	Banganje Tanglang	Kandro Boke
Kwala Molkwala Lakwala	Kalmai	Kaltanko
Teleng Molteleng Lamolteleng	Kalmai Tal	Kanje Nathe
Tilang Moltilang Lamoltilang	Kalmai	Kantilang
Nattuwa Lanattuwa	Kalmai	Talum-Ting
Endiye Beentiye Labwentiye	Kalmai Tal	Tal-Kilang Kilang
Kalai Molkalai Lamolkalai	Kalmai	
Sodo Molto Lamolto	Banganje	Kanje, Kwaya Konduk, Kwaya Runi
Kunjang Molkunjang Lakunjang	Banganje	Komtakunjang
Awule Molawule Lamolawule	Banganje Tanglang	Bore-Muto, Bore-Tulpilum, Bore-Konjirong Okbore
Sendai Molsendai Lamolsendai	Banganje	Sesser Oktal, Kwaya-Semdem

<i>Lasendai</i>		
<i>Golmo</i>	Banganje	<i>Kalkolmo</i>
<i>Molgolmo</i>		
<i>Lamolgolmo</i>		
<i>Boti</i>	Banganje	<i>Lambiga</i>
<i>Molboti</i>		
<i>Laboti</i>		
<i>Nate</i>	Banganje	<i>Banganjem-Tai, Kaller, Tulkata, Kalkunji, Nathe</i>
<i>Malate</i>		
<i>Lamalate</i>	Tanglang	<i>Kampandi, Kanje, Labanganje, Kwaya, Kalkulong, Kalaboti, Sakem</i>
<i>Molmalate</i>		
<i>Lamolmalate</i>		
<i>Lanate</i>		
<i>Kute</i>	Tanglang	<i>Oktong</i>
<i>Molkute</i>		
<i>Lamolkute</i>		
<i>Boba</i>	Tanglang	<i>Obi</i>
<i>Molboba</i>		
<i>Lamolboba</i>	Tal	<i>Domburom, Kalbore,</i>
<i>Yiboba</i>		
<i>Natuwa</i>	Tal	<i>Bagandara, Posangye, Talpandi, Tiwa-Buye</i>
<i>Malata</i>		
<i>Benata</i>		
<i>Labenata</i>		
<i>Kera</i>	Tal	<i>Bekeri</i>
<i>Molker</i>		
<i>Layikera</i>		
<i>Nabiye</i>	Tal	<i>Buye</i>
<i>Molle</i>		
<i>Benata</i>		
<i>Labenata</i>		
<i>Swal</i>	Tal	<i>Dwatang</i>
<i>Molswal</i>		
<i>Lamolswal</i>		
<i>Bore</i>	Tal	<i>Kalbore</i>
<i>Molbore</i>		
<i>Lamolbore</i>		
<i>Layibore</i>		
<i>Nanjiye</i>	Tal	<i>Kujengbuye, Lapugo</i>
<i>Molanjiye</i>		
<i>Lamolnajiye</i>		
<i>Tibe</i>	Tal	<i>Kolong</i>
<i>Moltibe</i>		
<i>Itibe</i>		
<i>Awulo</i>	Tal	<i>Layalang</i>
<i>Molawulo</i>		
<i>Lamolawulo</i>		
<i>Namma</i>	Tal	<i>Mwa</i>
<i>Malama</i>		
<i>Lamalama</i>		
<i>Asuyo</i>	Tal	<i>Powure-Buye</i>
<i>Molasuyo</i>		
<i>Lamolasyuo</i>		
<i>Tatuwa</i>	Tal	<i>Talduka</i>
<i>Mwalata</i>		
<i>Benata</i>		
<i>Kulong</i>	Tal	<i>Dwale</i>
<i>Molkulong</i>		
<i>Layikulong</i>		
<i>Tongo</i>	Todi	<i>Kise, Dongor, Layalang, Ladur</i>
<i>Moltongo</i>		
<i>Lamoltongo</i>		
<i>Latongo</i>		
<i>Sobih</i>	Todi	<i>Bore</i>
<i>Molsobih</i>		
<i>Lamolsobih</i>		
<i>Kwakal</i>	Todi	<i>Kumyege</i>
<i>Molkwakal</i>		
<i>Lamolkwakal</i>		
<i>Kolmo</i>	Todi	<i>Kalkolmo</i>
<i>Molkolmo</i>		
<i>Lamolkolmo</i>		

APPENDIX 6: Political administrative organization of Tangale-Waja region since 1906*

Date	Changes/Area						Source	
1906	From July-December 1910 subjection of Tangale-Waja Region, Tangale community (1907-15)							
1912	Tangaltong (Biliri + Bare)), Pero	Kaltungo, Shongom groups		Ture, Tula, Kamo, Dadiya	Cham, Awak	Waja	Gall (1913), Carlyle (1913)	
From 1915	Tangale-Waja independent District						Gall (1920)	
1918	Last determinations of southern and eastern borders of Tangale-Waja District						Rembelton (1913)	
1923-34	Tangale District	Kaltungo District (including Dadiya + Cham-Mona)			Waja District		Fremantle (1923), Louisdale (1925), Walker (1929), Cunnigham (1932), Matthews (1934)	
1936/37	Tangale District	Kaltungo District	Dadiya District	Cham District	Waja District	Longuda District	Mercer (1935), Newton (1937)	
1949-51	Tangale District	Kaltungo District	Dadiya District	Cham District	Waja District		Cole (1950)	
1952	Tangale District	Kaltungo District	Cham-Mona-Dadiya District		Waja District		Census 1952	
1960	Tangale District	Kaltungo District	Dadiya District	Cham-Mona District	Waja-Longuda District		Fricke (1965)	
1963	Tangale District	Kaltungo District	Dadiya District	Cham District	Waja District		Census 1960	
April 1977	Tangale District	Kaltungo District	Dadiya District	Kindiyo District	Waja-Longuda District		Aitchison et. al (1972)	
1977	Tangale-Waja Local Government Area							
1977	Tangale District (8 village areas)	Kaltungo District (14 village areas)		Dadiya District (2 village areas)		Cham District (2 village areas)	Waja District (16 village areas)	Statistics Unit (1977)
1982	Billiri LGA	Kaltungo LGA		Yemel LGA		Waja LGA		BSADP Atlas (1983)
1989	Billiri-Kaltungo LGA			Balanga LGA				Bauchi State Surveys (1987)
1991	Billiri LGA 750 km ²	Kaltungo LGA 1880 km ²		Balanga LGA 1450 km ²				Bauchi State Surveys (1991)
1996-Date	Billiri LGA	Kaltungo LGA	Shongom LGA	Balanga LGA				Macmillian Nigeria Atlas (2006)

*Adapted from Gwani (1999: 103-104)

APPENDIX 7: British Government War Cabinet papers 15th Nov. 1944*

*Paragraph 1—"The participation of the colonies in the war and the gratitude felt by this country for their effort increased our awareness of past deficiencies in our administration"

Paragraph 4—the proposal to provide basic economic and social services "communications, water and irrigation schemes, health and education and so on . . . as a single example I will quote an estimated minimum requirement in Nigeria of £27million in 10 years"

and for the last three, 1953-54 to 1955-56, £20 million. These would be over-all sums and would include provision for research and certain additional schemes such as higher education which I otherwise should have had to bring forward outside the scope of the present Act.

I have deliberately adopted the policy of increasing the annual figures as time goes on. Experience has shown that planning and preparation for Colonial development is bound to take time, that, as in rearmament, the actual expenditure increases by stages, and that it is only in the later years that full provision is needed.

6. I have discussed these proposals with the Chancellor of the Exchequer. He agrees that the Act should be extended for another ten-year period, and he agrees also that some substantial increase in the financial provision is necessary. He finds himself, however, unable to commit himself to anything further than a provision for the ten-year period of £10 million a year for development and £1 million for research. As I understand it, he does not base his alternative proposal on any criticism of my estimates of what the Colonial Empire will require but solely on the financial exigencies of this country.

7. I am afraid I am unable to accept the Chancellor's proposal. He has, if I may say so, treated me with great fairness, and it is in full agreement with him that I bring this matter to the War Cabinet. He feels, as I do, that the War Cabinet should have before them both the needs of the Colonial Empire, which I shall stress, and the difficulties of national finance, which he must emphasise.

8. Although the differences in money between my proposals and the counter proposals of the Chancellor are small in comparison with the national finances, they are to my mind fundamental when applied to Colonial development. From the over-all plans which I have so far received from Colonies, I am convinced that whereas under my proposal (with some pruning), it will be possible to undertake a practicable but far from extravagant scheme of development, with the Chancellor's figures planned development over a period of ten years would be impossible and in practice we should have to be content with a collection of individual projects instead of integrated plans, a practice which has been properly criticised in the past and which cannot give the best returns from the money. I have had, too, some opportunities of judging the psychology of Colonial peoples and Colonial administrations, and I am convinced that anything short of my plan would fail to meet their natural expectations and aspirations.

9. I am not pretending that the assistance to the Colonies which I propose will not impose some burden upon this country. I do, however, feel that the Colonial Empire means so much to us that we should be prepared to assume some burden for its future. If we are unable or unwilling to do so, are we justified in retaining, or shall we be able to retain, a Colonial Empire? The burden, however, is infinitesimal compared to the gigantic sums in which we are and shall be dealing. Nor is the apparent burden wholly real. If these sums are wisely spent, and the plans devoted to increasing the real productive power of the Colonies, there will in the long run accrue considerable benefit to us, either in the form of increased exports to us of commodities which otherwise we should have to obtain from hard currency countries, or in the form of increased exports from the Colonies as part of the sterling area to the hard currency countries outside.

10. But I am not basing my argument on material gains to ourselves, important as I think these may be. My feeling is that in the years to come, without the Commonwealth and Empire, this country will play a small rôle in world affairs, and that here we have an opportunity which may never recur, at a cost which is not extravagant, of setting the Colonial Empire on lines of development which will keep it in close and loyal contact with us. To say now in 1945 that with these great stakes at issue we shall not be able to afford £15 million in 1949, or £20 million in 1953, is a confession of our national impotence in the future. I take a less pessimistic view of our national future and it is for that reason that I ask the War Cabinet to approve the proposals which I put forward in paragraph 5.

Colonial Office,
15th November, 1944.

O. S.

APPENDIX 8: Integration values of spaces for compounds measured in the 2nd survey

S No	Spatial configuration	No. Of K spaces
<i>1st typology</i>		
1	Br = Br = Bt = An = Kt = Ø (1.02) > Ct (No value)	7
<i>2nd typology</i>		
2	Ct (3.03) > Rm (2.02) > Ct (1.21) > Ø = Br = Br = Kt = An (1.07) > Sr (1.01) > Br = Br (0.91) > Bt (0.70) > Br (0.63)	13
3	Ct (2.55) > Rm (1.70) > St = Bt = Ø (0.73) > Br = Br (0.64)	7
4	Ct (2.3) > Vr (1.38) > Ø = Br = Br = Br = Nb = Bt (0.77) > Br (0.46)	8
5	Ct (4.42) > Vr (1.659) > Rm = Ø (1.21) > An = An = Br = Bt = Kt (1.06) > Br (0.89) > Br (0.55)	11
6	Ct (2.65) > Vr = Sr (1.327) > Ø (1.11) > St = Vp (0.95) > St = Rm = Br = Br (0.698) > Ct (0.63)	11
7	Ct (4.55) > Ct = Vr = Br = Rm (1.40) > Kt = Br = Vr = Ø (1.21) > Br = Br = Br = Rm (0.76)	13
8	Ct (2.48) > An = Ct = Ø (1.47) > Vr = Vr (1.29) > Kt = Kt = Br = Br (1.12) > Ct = Br (1.08) > Ct (1.04) > Br = Br (0.83) > Bt (0.70) Br = Br (0.59)	18
9	Ct (3.13) > Vr (1.74) > Rm (1.21) > Ø = An = Vp = Bt = Kt (1.05) > Sr (0.92) > Kt (0.83) > Br (0.68) > Br (0.58)	12
10	Ct (4.44) > Vr (1.77) > Ø = Nb (1.11) > Ct = Kt = Vp (0.99) > Sr = Br (0.79)	9
11	Ct (2.65) > Rm = Vr (1.33) > Ct (1.11) > Kt = Vp (0.95) > Br = Br = St = St (0.70) > Ø (0.63)	11
12	Ct (3.45) > Vr (1.72) > Rm = Ø (0.99) > St = Bt (0.86) > Br = Br (0.69)	8
13	Ct (2.21) > Vr (1.47) > Sr (1.21) > Ø = Vp = Kt (0.89) > Rm (0.83) > Br (0.74) > Br = St (0.66) > Br (0.53)	11
14	Ct = Vr (1.38) > Sr (0.99) > Kt = Ø = Vp (0.63) > Br = Br (0.53)	8
15	Ct = Ø = Kt = Br = Br (No value)	5
16	Kt (1.55) > Vr (1.39) > Co (1.32) > Ct (1.26) > Sr (1.198) > Vr (1.10) > Ø (1.01) > St (0.85) > Rm (0.80) > Br = Bt = Br = Br (0.78) > St = Vp (0.75) > Rm (0.56)	16
17	Ct (2.60) > Vr (1.52) > Ct (1.40) > Ø (1.21) > An = Br = Kt = Sh (1.01) > Sr (0.96) > Br = Br (0.76) > Br = Br (0.61)	13
18	Ct (1.74) > Ct (1.57) > Ct = Ct (1.27) > Vr (1.14) > Kt = An = St = Vp (1.03) > Ø = Vr (0.97) > Vr (0.92) > Ct = Vr (0.89) > Vp = An = An = An (0.85) > Sr (0.81) > Br (0.79) > Br (0.71) > Br = Br = St = An (0.66) > Br (0.61) > Br = Br (0.55)	28
19	Ct (1.79) > Ct (1.61) > Ø (1.209) > Vr (1.18) > Vr (1.10) > Br = Br = Br = Rm (1.01) > Vp = Br = Kt (0.95) > Ct (0.88) > Sr (0.86) > Rm (0.78) > Rm (0.768) > Nb = Br = Br (0.64) > Br = Br = Br (0.63) > Br (0.58)	23
20	Ct (4.435) > Br = Vr (1.27) > An = Vp (0.99) > Ø = Rm (0.96) > Kt = Br (0.64)	9
21	Ct (3.32) > Vr (1.90) > Br = An = Nb = Bt = Kt = Ø (1.02) > Br (0.95) > St (0.83) > Br (0.58)	11
22	Ct (1.94) > Ct (1.55) > Ø = Vr (1.42) > Rm (1.32) > Rm (1.18) > Kt = Vp (1.11) > Sr = Rm (1.06) > Vr (1.03) > Ct (0.10) > Kt = Vp (0.97) > Br (0.92) > Br = St (0.87) > Rm (0.83) > Co (0.80) > Br = Br = Sr = Br (0.75) > Br (0.72) > Bt (0.63) > Br = Bt = Br (0.62) > Br (0.58)	29
23	Ct (2.98) > Ct (1.48) > Sr (1.11) > St = Vp = Kt (0.89) > Ct = Ø (0.68) > Br (0.59)	9
24	Ct (2.93) > Vr = Vr (1.63) > Vr (1.54) > Ø = Nb = Vp = Br = An = Kt (1.17) > Rm (0.98) > Sr (0.95) > Br = Br (0.89) > Br = Br = Br (0.65)	17
25	Ct (4.44) > Sr (1.78) > Ø = Kt = St = Vp = Cty (0.99) > Br = Br (0.74)	9
26	Ø = Nb = Br = Br = Bt (0.87) > Cty (No value)	6

27	Ct (4.16) > Vr (1.60) > Rm = Ø (1.39) > Vp = Rm = Sr = Br = Br = St (1.22) > Rm (0.91) > Br = Vr (0.77) > Br (0.60)	14
28	Ct (3.77) > Ct (1.76) > Vp = St = An = An = Br = Br = Br = Br = Kt = Ct (1.26) > Ø (1.05) > Br (0.76) > Vr (0.71) > Br (0.52)	16
29	Ct (3.32) > Vr (1.47) > Ø (1.21) > St = Br = Bt = Kt = Br (1.02) > Sr (0.83) > An (0.66) > Br (0.53)	11
30	Ct (1.76) > Vr (1.39) > Vr (1.15) > Sr (1.05) > Ø = St = An = Vp (0.91) > Dr = Sr = Br (0.71) > Br (0.68) > Br = Br = Br (0.54)	16
31	Ct (2.96) > Vr (1.48) > Ø = Kt = St = Vp = An (0.89) > Sr (0.81) > Br (0.49)	9
32	Ct (2.03) > Sr (1.76) > Co (1.26) > Vp = Bt = Ct (1.15) > Ø = Sr (1.05) > Br = Vr = An (0.98) > St = Br = Br = Br (0.75) > Br (0.68)	16
33	Ct (1.75) > Ø (1.60) > Rm (1.33) > Br (1.28) > Ct (1.24) > Co (1.13) > Br = An (1.01) > Co (0.99) > Vr = Vp = Vr = Kt (0.96) > Vr (0.785) > Sr (0.77) > Br (0.74) > An (0.69) > Rm ₁ (0.675) > Dr (0.57)	20
34	Ct (2.22) > Vr (1.77) > Sr (0.89) > Kt (0.86) > Ø = Vp = Nb (0.81) > Rm (0.74) > Br (0.52)	9
<i>3rd typology</i>		
35	Ct (2.72) > Vr = Vr (1.67) > Ø (1.56) > An (1.327) > Vp = Kt = An = St = Cp = Br = Sh (1.26) > Sr (1.23) > Vr (1.18) > Sr (1.06) > Br = Br (0.98) > An (0.85) > Br = Br = Br (0.81) > Br (0.75) > Br (0.78) > Wc (0.57)	24
36	Ct (1.96) > Vr (1.24) > Kt = Ø (1.12) > Bt (1.02) > Rm = Rm (0.94) > Sr (0.84) > Ct = Sr (0.74) > Vp (0.65) > Br = Br (0.59) > Br = An (0.52)	15
37	Ct (5.20) > Rm = Rm = Br = Br (1.49) > Ø = Kt = Bt = Vp = An (1.30) > Br = Br = Br = Br (0.8)	14
38	Vr (1.80) > Co (1.76) > Ct (1.68) > Kt (1.38) > Ver (1.31) > Co (1.27) > Dr (1.21) > Ct (1.19) > Sr (1.14) > Ø (1.09) > Rm = Rm = Rm = Rm (1.07) > Rm = Br = Br (1.06) > Co (1.10) > Kt = Cp = An (1.03) > St (0.91) > Co (0.89) > An (0.86) > Br (0.83) > An (0.79) > Bt (0.78) > Br = Wc = Br (0.67) > An (0.61)	31
39	Ct (3.0) > Ø (2.14) > Vr (1.55) > Sr (1.45) > Sr (1.36) > Kt = Kt = Kt = Bt = Br (1.29) > Sh (1.22) > Vr (1.15) > Sh = Vp = Sh = St (1.10) > Sr (1.0) > Br (0.88) > Br (0.85) > Sh (0.76) > Br = Br (0.69)	22
40	Ct (2.22) > Vr (1.77) > Sr (0.89) > Ø = St = Br = Vp (0.81) > Br (0.52) > Br (0.74)	9
<i>4th typology</i>		
41	Sr (1.76) > Dr (1.55) > Vr (1.26) > Ct = Co (1.15) > Co (1.05) > Kt (0.91) > Ø = An = An = Br = Br = Br = Wc (0.71) > Br = Wc (0.69) > St (0.68)	16
42	Sr = Dr (1.65) > Kt (1.39) > Ct = Vr (1.32) > Co (1.01) > Br (0.94) > Br = Br (0.88) > St (0.80) > Kt = Vp = Ø (0.78) > Br = Wc (0.66) > Wc (0.63)	16
43	Ct (2.08) > Sr (1.734) > Co (1.16) > Rm = Br (1.04) = Kt = Vp = Ø (0.95) > St (0.87) > Br = Bt = Br (0.69) > Br (0.65) > Br ₂ (0.60)	14
44	Co (3.66) > Ct (1.95) > Kt (1.54) > Sr = Br = Br = Br (1.39) > St = Dr (1.27) > Vr (1.13) > Vr (1.05) > Ø = Vp (0.98) > St (0.86) > Wc = Wc = Wc (0.81)	17
45	Sr (1.33) > Vr (1.21) > Co (1.02) > Ct (0.95) > Kt (0.70) > Br = Br = Wc (0.60) > Ø = An = An (0.58)	11

Legend

C t = Courtyard
 Ø = Forecourt/outside space
 Rm = Room
 Sh = Shop
 Br = Bedroom

Vr = Veranda
 An = Animal shed
 St = Store
 Dr = Dining room

Sr = Sitting room
 Bt = Bath Wc = Wc
 Nb = New building

Vp = VIP toilet
 Kt = Kitchen
 Co = Corridor
 Cp = Carport

APPENDIX 9: Kinship and family structure

S/ No	Extended, Composite or Nuclear	Pop. in compound	Religion	No of relatives as neighbours /4 sides	Location of compound and relationship to entire community	Lived all of life here	Reasons for relocation
1st typology							
1	Extended	4	Christianity	4	Within clan lands	Yes	N.A.
2nd typology							
2	Extended	25	Islam	4	Within clan lands	Yes	N.A.
3	Nuclear	2	Christianity	4	Within clan lands	No	Community relocation
4	Nuclear	5	Christianity	2	Within clan lands	No	Community relocation
5	Extended	9	Christianity	3	Within clan lands	Yes	N.A.
6	Extended	7	Christianity	0	Within clan lands	Yes	N.A.
7	Extended	15	Christianity	4	Within clan lands	Yes	N.A.
8	Extended	7	Traditional religion	4	Within clan lands	No	1948 Relocation
9	Extended	6	Christianity	2	Within clan lands	No	School
10	Nuclear	10	Christianity	4	Within clan lands	Yes	N.A.
11	Extended	2	Christianity	2	Late husband's clan area	No	Marriage
12	Extended	3	Christianity	4	Within clan lands	Yes	N.A.
13	Extended	7	Christianity	4	Within clan lands	Yes	N.A.
14	Nuclear	8	Christianity	4	Within clan lands	Yes	N.A.
15	Extended	3	Christianity	4	Within clan lands	No	1948 Relocation
16	Extended	8	Christianity	1	Within clan lands	Yes	N.A.
17	Nuclear	6	Christianity	4	Within clan lands	Yes	N.A.
18	Composite	9	Christianity	4	Within clan lands	No	Start own family
19	Composite	18	Christianity	3	Within clan lands	Yes	N.A.
20	Extended	11	Islam	2	Within clan lands	Yes	N.A.
21	Extended	8	Christianity	3	Within clan lands	Yes	N.A.
22	Composite	18	Islam	1	Within clan lands	No	1948 Relocation
23	Nuclear	6	Christianity	2	Within clan lands	Yes	N.A.
24	Nuclear	4	Christianity	0	Within clan lands	No	Start own family
25	Nuclear	8	Christianity	4	Within clan lands	No	Start own family
26	Extended	4	Christianity	3	Within clan lands	Yes	N.A.
27	Composite	15	Christianity	0	Within clan lands	No	Start own family
28	Composite	24	Islam	1	Within clan lands	Yes	N.A.
29	Extended	4	Christianity	2	Within clan lands	Yes	N.A.
30	Extended	9	Christianity	3	Within clan lands	No	To care for aged parents
31	Extended	7	Christianity	4	Within clan lands	Yes	N.A.
32	Extended	6	Christianity	0	Within clan lands	No	New job
33	Extended	9	Christianity	0	Within clan lands	No	Start own family
34	Extended	10	Christianity	1	Within clan lands	No	Start family
3rd typology							
35	Extended	12	Islam	0	Within clan lands	No	Start own family
36	Nuclear	5	Christianity	0	Within clan lands	Yes	N.A.
37	Extended	12	Christianity	0	From another clan	No	New job
38	Extended	9	Christianity	0	Within clan lands	No	Start own family
39	Extended	9	Christianity	0	Late husband's clan lands	No	Creation of new state
40	Nuclear	6	Islam	1	Within clan lands	No	Start own family
4th typology							
41	Extended	5	Christianity	0	Late husband's clan area	No	Death of spouse
42	Extended	7	Christianity	0	From another clan	No	Resettle at home after retirement
43	Extended	12	Christianity	0	Within clan lands	No	School for children
44	Nuclear	4	Christianity	0	Within clan lands	No	Start own family
45	Nuclear	3	Christianity	0	Late husband's clan area	No	Death of spouse

APPENDIX 10: Activities and use of space within compounds

Cpd 1 (24, total number of recorded activities within the compound, sum of activities in each space)				
<i>Ct</i> (12)	Receiving guests ^{Soc} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Afternoon nap ^{Lei} Sitting ^{Lei} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Threshing grain ^{FFP}	<i>Br</i> (3) <i>An</i> (1)	Outdoor cooking ^{FFP} Washing up ^{FFP} Maintenance (cpd walls) ^{Oth} Laundry ^{PN} Dressing up ^{PN} Sleeping at night ^{PN} Storing food/farm produce ^{FW} Goats ^{Ani}	<i>Kt</i> (2) <i>Bt</i> (1) <i>Ø</i> (5) Indoor cooking ^{FFP} Storing food ^{FW} Bathing ^{PN} Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Listening to radio ^{Soc} Afternoon nap ^{Lei}
Cpd 2 (31)				
<i>Ct</i> (16)	Receiving guests ^{Soc} Conversing with family ^{Soc} Listening to radio ^{Soc} Laundry ^{PN} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Maintenance (cpd walls) ^{Oth} Sheep ^{Ani} Cattle ^{Ani} Preparing vegetables ^{FFP}	<i>Rm</i> (2) <i>Vp</i> (2)	Preparing condiments ^{FFP} Outdoor cooking ^{FFP} Washing up ^{FFP} Indoor cooking ^{FFP} Play (children) ^{Lei} Afternoon nap ^{Lei} Storing food/farm produce ^{FW} Storage of tools ^{FW} Bathing ^{PN} Toilet ^{PN}	<i>Sr</i> (3) <i>Br</i> (3) <i>Ø</i> (5) Watching TV ^{Soc} Listening to radio ^{Soc} Eating meals ^{Eat} Dressing up ^{PN} Sleeping at night ^{PN} Prayers ^{PN} Conversing with family ^{Soc} Talking to friends ^{Soc} Selling sugarcane ^{Eco} Play (children) ^{Lei} Sitting ^{Lei}
Cpd 3 (11)				
<i>Ct</i> (6)	Receiving guests ^{Soc} Conversing with family ^{Soc} Listening to radio ^{Soc} Afternoon nap ^{Lei}	<i>Br</i> (2)	Sitting ^{Lei} Eating meals ^{Eat} Dressing up ^{PN} Sleeping at night ^{PN}	<i>Bt</i> (1) <i>St</i> (2) Bathing ^{PN} Storing food/farm produce ^{FW} Storage of tools ^{FW}
Cpd 4 (23)				
<i>Ct</i> (13)	Receiving guests ^{Soc} Conversing with family ^{Soc} Listening to radio ^{Soc} Eating meals ^{Eat} Eating snacks ^{Eat} Afternoon nap ^{Lei} Maintenance (cpd walls) ^{Oth} Laundry ^{PN}	<i>Vr</i> (2)	Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Threshing grain ^{FFP} Washing up ^{FFP} Outdoor cooking ^{FFP} Afternoon nap ^{Lei} Outdoor cooking ^{FFP}	<i>Br</i> (4) <i>Bt</i> (1) <i>Ø</i> (3) Dressing up ^{PN} Sleeping at night ^{PN} Storing food/farm produce ^{FW} Storage of tools ^{FW} Bathing ^{PN} Receiving guests ^{Soc} Talking to friends ^{Soc} Sitting ^{Lei}
Cpd 5 (41)				
<i>Ct</i> (15)	Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Laundry ^{PN} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Play (children) ^{Lei} Sitting ^{Lei} Storage of tools ^{FW} Cattle ^{Ani} Maintenance (cpd walls) ^{Oth} Preparing vegetables ^{FFP} Preparing condiments ^{FFP}	<i>Vr</i> (9) <i>Ø</i> (9)	Outdoor cooking ^{FFP} Washing up ^{FFP} Receiving guests ^{Soc} Conversing with family ^{Soc} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Afternoon nap ^{Lei} Sitting ^{Lei} Storage of tools ^{FW} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Receiving guests ^{Soc} Talking to friends ^{Soc} Games (children) ^{Lei}	 <i>Rm</i> (2) <i>Br</i> (2) <i>Bt</i> (1) <i>Kt</i> (1) <i>An</i> (2) Sitting ^{Lei} Afternoon nap ^{Lei} Bagging farm produce ^{FW} Maintenance (cpd walls) ^{Oth} Preparing groundnuts ^{FFP} Threshing grain ^{FFP} Storing food/farm produce ^{FW} Storage of tools ^{FW} Dressing up ^{PN} Sleeping at night ^{PN} Bathing ^{PN} Indoor cooking ^{FFP} Sheep ^{Ani} Poultry ^{Ani}
Cpd 6 (35)				
<i>Ct</i> (12)	Conversing with family ^{Soc} Laundry ^{PN} Storage of tools ^{FW} Growing crops/vegetables ^{FW} Cattle ^{Ani} Maintenance (cpd walls) ^{Oth} Threshing grain ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP}	<i>Ø</i> (7) <i>Vp</i> (3)	Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Afternoon nap ^{Lei} Sitting ^{Lei} Play (children) ^{Lei} Preparing groundnuts ^{FFP} Bathing ^{PN} Toilet ^{PN}	<i>Vr</i> (7) <i>Br</i> (1) <i>Sr</i> (3) Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Sitting ^{Lei} Preparing groundnuts ^{FFP} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Sleeping at night ^{PN} Receiving guests ^{Soc}

	Outdoor cooking ^{FFP} Washing up ^{FFP} Eating sugarcane, snacks ^{Eat}	<i>Rm</i> (2)	Dressing up ^{PN} Storing food/farm produce ^{FW} Storage of tools ^{FW}	Watching TV ^{Soc} Eating meals ^{Eat}
Cpd 7 (29)				
<i>Ct</i> (15)	Conversing with family ^{Soc} Talking to friends ^{Soc} Laundry ^{PN} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Bagging farm produce ^{FW} Maintenance (cpd walls) ^{Oth} Cattle ^{Ani} Play (children) ^{Lei}	<i>Vr</i> (9)	Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Preparing groundnuts ^{FFP} Outdoor cooking ^{FFP} Washing up ^{FFP} Threshing grain ^{FFP} Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Eating meals ^{Eat}	Eating sugarcane, snacks ^{Eat} Afternoon nap ^{Lei} Sitting ^{Lei} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Indoor cooking ^{FFP} Sleeping at night ^{PN} Dressing up ^{PN} Storing food/farm produce ^{FW} Storage of tools ^{FW}
Cpd 8 (33)				
<i>Ct</i> (13)	Laundry ^{PN} Sheep ^{Ani} Play (children) ^{Lei} Bagging farm produce ^{FW} Storing food/farm produce ^{FW} Growing crops/vegetables ^{FW} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Preparing groundnuts ^{FFP} Outdoor cooking ^{FFP} Washing up ^{FFP}	<i>Vr</i> (12)	Threshing grain ^{FFP} Maintenance (cpd walls) ^{Oth} Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Storing food/farm produce ^{FW} Storage of tools ^{FW} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Afternoon nap ^{Lei} Sitting ^{Lei}	Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Preparing groundnuts ^{FFP} Talking to friends ^{Soc} Receiving guests ^{Soc} Sleeping at night ^{PN} Dressing up ^{PN} Storing food/farm produce ^{FW} Indoor cooking ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP}
Cpd 9 (38)				
<i>Ct</i> (16)	Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Laundry ^{PN} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Afternoon nap ^{Lei} Sitting ^{Lei} Maintenance (cpd walls) ^{Oth} Bagging farm produce ^{FW} Growing crops/vegetables ^{FW} Washing up ^{FFP}	<i>Kt</i> (1) <i>Vr</i> (2) <i>Rm</i> (1) \emptyset (7)	Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Preparing groundnuts ^{FFP} Outdoor cooking ^{FFP} Indoor cooking ^{FFP} Conversing with family ^{Soc} Storing tools ^{FW} Storing food/farm produce ^{FW} Talking to friends ^{Soc} Receiving guests ^{Soc} Listening to radio ^{Soc} Conversing with family ^{Soc} Afternoon nap ^{Lei}	Play/games ^{Lei} Sitting ^{Lei} Poultry ^{Ani} Watching TV ^{Soc} Listening to radio ^{Soc} Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Eating meals ^{Eat} Sleeping at night ^{PN} Dressing up ^{PN} Bathing ^{PN} Toilet ^{PN}
Cpd 10 (38)				
<i>Ct</i> (16)	Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Listening to radio ^{Soc} Cattle ^{Ani} Play (children) ^{Lei} Afternoon nap ^{Lei} Sitting ^{Lei} Laundry ^{PN} Bagging farm produce ^{FW} Maintenance (cpd walls) ^{Oth} Preparing groundnuts ^{FFP} Outdoor cooking ^{FFP}	<i>Vr</i> (5) <i>St</i> (2) <i>Sr</i> (5)	Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Washing up ^{FFP} Conversing with family ^{Soc} Receiving guests ^{Soc} Talking to friends ^{Soc} Eating meals ^{Eat} Eating snacks ^{Eat} Storing tools ^{FW} Storing food/farm produce ^{FW} Watching TV ^{Soc} Listening to radio ^{Soc} Receiving guests ^{Soc}	Eating meals ^{Eat} Sleeping at night ^{PN} Sleeping at night ^{PN} Dressing up ^{PN} Indoor cooking ^{FFP} Preparing vegetables ^{FFP} Storing food/farm produce ^{FW} Bathing ^{PN} Talking to friends ^{Soc} Conversing with family ^{Soc} Listening to radio ^{Soc} Sheep ^{Ani}
Cpd 11 (33)				
<i>Ct</i> (18)	Receiving guests ^{Soc} Conversing with family ^{Soc} Talking to friends ^{Soc} Laundry ^{PN} Eating meals ^{Eat} Eating sugarcane, snacks ^{Eat} Afternoon nap ^{Lei}	<i>Br</i> (2) \emptyset (3)	Storing food/farm produce ^{FW} Washing up ^{FFP} Preparing groundnuts ^{FFP} Outdoor cooking ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Poultry ^{Ani}	Preparing vegetables ^{FFP} Storing food/farm produce ^{FW} Sleeping at night ^{PN} Dressing up ^{PN} Talking to friends ^{Soc} Conversing with family ^{Soc} Preparing groundnuts ^{FFP}

	Sitting ^{Lei}	Vr(3)	Outdoor cooking ^{FFP}	Rm(2)	Storing food/farm produce ^{FW}
	Maintenance (cpd walls) ^{Oth}		Afternoon nap ^{Lei}		Storing tools ^{FW}
	Bagging farm produce ^{FW}		Sitting ^{Lei}	Bt(2)	Bathing ^{PN}
	Growing crops/vegetables ^{FW}	Kt(3)	Indoor cooking ^{FFP}		Toilet ^{PN}
Cpd 12 (34)					
Ct (13)	Conversing with family ^{Soc}		Eating meals ^{Eat}		Dressing up ^{PN}
	Laundry ^{PN}		Eating sugarcane, snacks ^{Eat}		Storing food/farm produce ^{FW}
	Play ^{Lei}	Vr(5)	Storing food/farm produce ^{FW}		Receiving guests ^{Soc}
	Bagging farm produce ^{FW}		Storing tools ^{FW}		Conversing with family ^{Soc}
	Storing food/farm produce ^{FW}		Indoor cooking ^{FFP}	Ø (6)	Eating meals ^{Eat}
	Storing tools ^{FW}		Preparing vegetables ^{FFP}		Talking to friends ^{Soc}
	Outdoor cooking ^{FFP}		Preparing condiments ^{FFP}		Conversing with family ^{Soc}
	Preparing vegetables ^{FFP}	St(2)	Storing food/farm produce ^{FW}		Receiving guests ^{Soc}
	Preparing condiments ^{FFP}		Storing tools ^{FW}		Listening to radio ^{Soc}
	Threshing grain ^{FFP}	Bt(1)	Bathing ^{PN}		Afternoon nap ^{Lei}
	Washing up ^{FFP}	Br(6)	Sleeping at night ^{PN}		Sitting ^{Lei}
				Rm(1)	Receiving guests ^{Soc}
Cpd 13 (40)					
Ct (12)	Conversing with family ^{Soc}	Vr (11)	Conversing with family ^{Soc}	Kt(2)	Indoor cooking ^{FFP}
	Laundry ^{PN}		Receiving guests ^{Soc}		Preparing condiments ^{FFP}
	Play ^{Lei}		Eating meals ^{Eat}	Bt(3)	Bathing ^{PN}
	Bagging farm produce ^{FW}		Eating sugarcane, snacks ^{Eat}		Toilet ^{PN}
	Storing food/farm produce ^{FW}		Afternoon nap ^{Lei}		Dressing up ^{PN}
	Storing tools ^{FW}		Sitting ^{Lei}	Sr(5)	Talking to friends ^{Soc}
	Poultry ^{Ani}		Preparing vegetables ^{FFP}		Conversing with family ^{Soc}
	Maintenance (cpd walls) ^{Oth}		Preparing condiments ^{FFP}		Receiving guests ^{Soc}
	Threshing grain ^{FFP}		Preparing groundnuts ^{FFP}		Listening to radio ^{Soc}
	Washing up ^{FFP}		Sewing ^{Eco}		Watching TV ^{Soc}
	Outdoor cooking ^{FFP}		Maintenance (tools) ^{Oth}	Br(3)	Sleeping at night ^{PN}
	Preparing groundnuts ^{FFP}	Rm(2)	Storing food/farm produce ^{FW}		Dressing up ^{PN}
Ø (1)	Play ^{Lei}		Storing tools ^{FW}	An(1)	Afternoon nap ^{Lei}
					Poultry ^{Ani}
Cpd 14 (42)					
Ct (18)	Receiving guests ^{Soc}		Outdoor cooking ^{FFP}	Ø (9)	Dressing up ^{PN}
	Conversing with family ^{Soc}		Cattle ^{Ani}		Receiving guests ^{Soc}
	Laundry ^{PN}		Goats ^{Ani}		Conversing with family ^{Soc}
	Eating meals ^{Eat}	Vr(4)	Maintenance (walls) ^{Oth}		Listening to radio ^{Soc}
	Eating sweets, snacks ^{Eat}		Afternoon nap ^{Lei}		Talking to friends ^{Soc}
	Storing food/farm produce ^{FW}		Sitting ^{Lei}		Preparing groundnuts ^{FFP}
	Growing crops/vegetables ^{FW}		Storing tools ^{FW}		Preparing vegetables ^{FFP}
	Bagging farm produce ^{FW}		Storing food/farm produce ^{FW}		Afternoon nap ^{Lei}
	Storing tools ^{FW}	Sr(5)	Listening to radio ^{Soc}		Sitting ^{Lei}
	Washing up ^{FFP}		Watching TV ^{Soc}		Play ^{Lei}
	Preparing vegetables ^{FFP}		Sleeping at night ^{PN}	Kt(2)	Indoor cooking ^{FFP}
	Preparing condiments ^{FFP}		Conversing with family ^{Soc}		Storing food/farm produce ^{FW}
	Preparing groundnuts ^{FFP}	Br(2)	Eating meals ^{Eat}	Bt(2)	Bathing ^{PN}
	Threshing grain ^{FFP}		Sleeping at night ^{PN}		Toilet ^{PN}
Cpd 15 (22)					
Ct (16)	Receiving guests ^{Soc}		Eating snacks ^{Eat}		Threshing grain ^{FFP}
	Conversing with family ^{Soc}		Afternoon nap ^{Lei}	Br(4)	Outdoor cooking ^{FFP}
	Talking to friends ^{Soc}		Sitting ^{Lei}		Sleeping at night ^{PN}
	Listening to radio ^{Soc}		Maintenance ^{Oth}		Dressing up ^{PN}
	Laundry ^{PN}		Washing up ^{FFP}		Storing tools ^{FW}
	Bathing ^{PN}		Preparing vegetables ^{FFP}		Storing food/farm produce ^{FW}
	Eating meals ^{Eat}		Preparing condiments ^{FFP}	Kt(2)	Indoor cooking ^{FFP}
					Preparing condiments ^{FFP}
Cpd 16 (34)					
Ct (14)	Receiving guests ^{Soc}		Outdoor cooking ^{FFP}	Dr(1)	Eating meals ^{Eat}
	Laundry ^{PN}		Eating meals ^{Eat}	Kt(1)	Indoor cooking ^{FFP}
	Play/games ^{Lei}		Eating snacks ^{Eat}	St(2)	Storing tools ^{FW}
	Bagging farm produce ^{FW}	Vr(3)	Play/games ^{Lei}		Storing food/farm produce ^{FW}
	Storing food/farm produce ^{FW}		Preparing vegetables ^{FFP}	Rm(2)	Storing tools ^{FW}

	Maintenance ^{Oth} Washing up ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Threshing grain ^{FFP} Preparing groundnuts ^{FFP}	Sr(5)	Preparing condiments ^{FFP} Listening to radio ^{Soc} Watching TV ^{Soc} Conversing with family ^{Soc} Receiving guests ^{Soc} Talking to friends ^{Soc}	Bt(1) Vp(1) Br(4)	Storing food/farm produce ^{FW} Bathing ^{PN} Toilet ^{PN} Sleeping at night ^{PN} Dressing up ^{PN} Sitting ^{Lei} Afternoon nap ^{Lei}
Cpd 17 (37)					
Ct (16)	Conversing with family ^{Soc} Laundry ^{PN} Bathing ^{PN} Eating snacks ^{Eat} Play/games ^{Lei} Bagging farm produce ^{FW} Storing food/farm produce ^{FW} Storing tools ^{FW} Growing crops/vegetables ^{FW} Maintenance ^{Oth} Threshing grain ^{FFP} Preparing groundnuts ^{FFP}	Sh(1) Vr (11)	Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Washing up ^{FFP} Outdoor cooking ^{FFP} Provision store ^{Eco} Conversing with family ^{Soc} Receiving guests ^{Soc} Talking to friends ^{Soc} Listening to radio ^{Soc} Eating meals ^{Eat} Eating snacks ^{Eat} Afternoon nap ^{Lei}	Br(3) Sr(3) Kt(2) An(1)	Sitting ^{Lei} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Preparing groundnuts ^{FFP} Sleeping at night ^{PN} Dressing up ^{PN} Eating meals ^{Eat} Conversing with family ^{Soc} Listening to radio ^{Soc} Sleeping at night ^{PN} Indoor cooking ^{FFP} Storing food/farm produce ^{FW} Pigs ^{Ani}
Cpd 18 (39)					
Ct (12)	Conversing with family ^{Soc} Laundry ^{PN} Bagging farm produce ^{FW} Storing food/farm produce ^{FW} Storing tools ^{FW} Growing crops/vegetables ^{FW} Goats ^{Ani} Maintenance ^{Oth} Preparing groundnuts ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Washing up ^{FFP} Toilet ^{PN}	Sr(3) Br(2) Bt(1) An(5) St(2)	Receiving guests ^{Soc} Watching TV ^{Soc} Eating meals ^{Eat} Sleeping at night ^{PN} Dressing up ^{PN} Bathing ^{PN} Pigs ^{Ani} Sheep ^{Ani} Poultry ^{Ani} Rabbits ^{Ani} Pigeons ^{Ani} Storing food/farm produce ^{FW} Storing tools/equipment ^{FW}	Vr (13)	Conversing with family ^{Soc} Receiving guests ^{Soc} Talking to friends ^{Soc} Listening to radio ^{Soc} Sleeping at night ^{PN} Eating meals ^{Eat} Eating snacks ^{Eat} Afternoon nap ^{Lei} Play/games ^{Lei} Sitting ^{Lei} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Outdoor cooking ^{FFP}
Cpd 19 (36)					
Ct (22)	Conversing with family ^{Soc} Receiving guests ^{Soc} Talking to friends ^{Soc} Listening to radio ^{Soc} Laundry ^{PN} Bathing ^{PN} Eating meals ^{Eat} Eating snacks ^{Eat} Play/games ^{Lei} Sitting ^{Lei} Bagging farm produce ^{FW} Storing food/farm produce ^{FW} Storing tools ^{FW}	Vr(3) Vp(3)	Growing crops/vegetables ^{FW} Cattle ^{Ani} Maintenance ^{Oth} Preparing groundnuts ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Washing up ^{FFP} Threshing grain ^{FFP} Outdoor cooking ^{FFP} Conversing with family ^{Soc} Receiving guests ^{Soc} Listening to radio ^{Soc} Toilet ^{PN}	Br(2) Sr(2) Rm(2) Kt(2)	Dressing up ^{PN} Bathing ^{PN} Sleeping at night ^{PN} Dressing up ^{PN} Eating meals ^{Eat} Conversing with family ^{Soc} Storing tools ^{FW} Storing food/farm produce ^{FW} Indoor cooking ^{FFP} Storing food/farm produce ^{FW}
Cpd 20 (29)					
Ct (15)	Conversing with family ^{Soc} Talking to friends ^{Soc} Laundry ^{PN} Eating meals ^{Eat} Eating snacks ^{Eat} Play/games ^{Lei} Sitting ^{Lei} Bagging farm produce ^{FW} Storing food/farm produce ^{FW} Storing tools ^{FW}	Rm(2) Br(3)	Growing crops/vegetables ^{FW} Maintenance ^{Oth} Washing up ^{FFP} Threshing grain ^{FFP} Outdoor cooking ^{FFP} Storing tools ^{FW} Storing food/farm produce ^{FW} Sleeping at night ^{PN} Dressing up ^{PN} Prayers ^{PN}	Vr(3) Kt(3) An(1) Vp(2)	Conversing with family ^{Soc} Receiving guests ^{Soc} Talking to friends ^{Soc} Indoor cooking ^{FFP} Preparing vegetables ^{FFP} Preparing condiments ^{FFP} Sheep ^{Ani} Bathing ^{PN} Toilet ^{PN}

Cpd 21 (33)					
Ct (13)	Conversing with family ^{Soc}	Ø (11)	Outdoor cooking ^{FFP}	Kt(1) Bt(1) Vr(2) Br(2) St(2) An(1)	Preparing vegetables ^{FFP}
	Laundry ^{PN}		Washing up ^{FFP}		Preparing condiments ^{FFP}
	Eating meals ^{Eat}		Receiving guests ^{Soc}		Indoor cooking ^{FFP}
	Eating snacks ^{Eat}		Conversing with family ^{Soc}		Bathing ^{PN}
	Bagging farm produce ^{FW}		Listening to radio ^{Soc}		Storing food/farm produce ^{FW}
	Storing food/farm produce ^{FW}		Talking to friends ^{Soc}		Storing tools ^{FW}
	Storing tools ^{FW}		Play/games ^{Lei}		Sleeping at night ^{PN}
	Maintenance ^{Oth}		Sitting ^{Lei}		Dressing up ^{PN}
	Threshing grain ^{FFP}		Afternoon nap ^{Lei}		Storing food/farm produce ^{FW}
	Preparing vegetables ^{FFP}		Preparing groundnuts ^{FFP}		Storing tools/equipment ^{FW}
	Preparing condiments ^{FFP}		Eating snacks ^{Eat}		Sheep ^{Ani}
	Cpd 22 (47)				
Ct (16)	Receiving guests ^{Soc}	Vr (11) Vp(1) Kt(2) Rm(3)	Receiving guests ^{Soc}	Br(3) St(2) Sr(3)	Toilet ^{PN}
	Talking to friends ^{Soc}		Talking to friends ^{Soc}		Sleeping at night ^{PN}
	Conversing with family ^{Soc}		Conversing with family ^{Soc}		Dressing up ^{PN}
	Listening to radio ^{Soc}		Listening to radio ^{Soc}		Prayers ^{PN}
	Laundry ^{PN}		Eating meals ^{Eat}		Selling firewood ^{Eco}
	Eating meals ^{Eat}		Eating snacks ^{Eat}		Receiving guests ^{Soc}
	Eating snacks ^{Eat}		Sitting ^{Lei}		Talking to friends ^{Soc}
	Play/games ^{Lei}		Afternoon nap ^{Lei}		Conversing with family ^{Soc}
	Sitting ^{Lei}		Preparing vegetables ^{FFP}		Listening to radio ^{Soc}
	Afternoon nap ^{Lei}		Preparing condiments ^{FFP}		Sitting ^{Lei}
	Growing crops/vegetables ^{FW}		Outdoor cooking ^{FFP}		Storing food/farm produce ^{FW}
	Maintenance ^{Oth}		Bathing ^{PN}		Storing tools/equipment ^{FW}
	Preparing vegetables ^{FFP}		Indoor cooking ^{FFP}		Talking to friends ^{Soc}
	Preparing condiments ^{FFP}		Preparing condiments ^{FFP}		Conversing with family ^{Soc}
	Outdoor cooking ^{FFP}		Storing tools ^{FW}		Receiving guests ^{Soc}
	Washing up ^{FFP}		Storing food/farm produce ^{FW}		
Cpd 23 (35)					
Ct (15)	Talking to friends ^{Soc}	Sr(9)	Preparing vegetables ^{FFP}	Vp(2) Kt(3) Br(3) St(3)	Bathing ^{PN}
	Conversing with family ^{Soc}		Preparing condiments ^{FFP}		Toilet ^{PN}
	Receiving guests ^{Soc}		Washing up ^{FFP}		Indoor cooking ^{FFP}
	Listening to radio ^{Soc}		Talking to friends ^{Soc}		Preparing condiments ^{FFP}
	Laundry ^{PN}		Conversing with family ^{Soc}		Preparing vegetables ^{FFP}
	Eating snacks ^{Eat}		Receiving guests ^{Soc}		Sleeping at night ^{PN}
	Play/games ^{Lei}		Listening to radio ^{Soc}		Dressing up ^{PN}
	Sitting ^{Lei}		Watching TV ^{Soc}		Afternoon nap ^{Lei}
	Afternoon nap ^{Lei}		Sleeping at night ^{PN}		Storing food/farm produce ^{FW}
	Growing crops/vegetables ^{FW}		Dressing up ^{PN}		Storing tools/equipment ^{FW}
	Maintenance ^{Oth}		Eating snacks ^{Eat}		Bagging farm produce ^{FW}
	Threshing grain ^{FFP}		Eating meals ^{Eat}		
Cpd 24 (44)					
Ct (14)	Conversing with family ^{Soc}	Vr (11) Rm(2) Vp(2)	Receiving guests ^{Soc}	Ø (6) Sr(5) Br(3)	Receiving guests ^{Soc}
	Laundry ^{PN}		Talking to friends ^{Soc}		Conversing with family ^{Soc}
	Play/games ^{Lei}		Conversing with family ^{Soc}		Listening to radio ^{Soc}
	Storing food/farm produce ^{FW}		Listening to radio ^{Soc}		Talking to friends ^{Soc}
	Storing tools/equipment ^{FW}		Play/games ^{Lei}		Games ^{Lei}
	Bagging farm produce ^{FW}		Sitting ^{Lei}		Sitting ^{Lei}
	Growing crops/vegetables ^{FW}		Afternoon nap ^{Lei}		Talking to friends ^{Soc}
	Maintenance ^{Oth}		Outdoor cooking ^{FFP}		Conversing with family ^{Soc}
	Threshing grain ^{FFP}		Preparing condiments ^{FFP}		Receiving guests ^{Soc}
	Outdoor cooking ^{FFP}		Preparing vegetables ^{FFP}		Eating snacks ^{Eat}
	Preparing condiments ^{FFP}		Eating snacks ^{Eat}		Eating meals ^{Eat}
	Preparing vegetables ^{FFP}		Storing tools ^{FW}		Sleeping at night ^{PN}
	Washing up ^{FFP}		Storing food/farm produce ^{FW}		Dressing up ^{PN}
	Selling planks ^{Eco}		Bathing ^{PN}		Talking to friends ^{Soc}
An(1)	Goats ^{Ani}	Toilet ^{PN}			
Cpd 25 (39)					
Ct (20)	Receiving guests ^{Soc}		Growing crops/vegetables ^{FW}	Sr(7)	Talking to friends ^{Soc}
	Conversing with family ^{Soc}		Maintenance ^{Oth}		Conversing with family ^{Soc}
	Listening to radio ^{Soc}		Threshing grain ^{FFP}		Receiving guests ^{Soc}

339

	Laundry ^{PN}	Kt(3)	Indoor cooking ^{FFP}		Dressing up ^{PN}
	Bagging farm produce ^{FW}		Preparing condiments ^{FFP}	Bt(1)	Bathing ^{PN}
	Storing food/farm produce ^{FW}		Preparing vegetables ^{FFP}	Br(2)	Sleeping at night ^{PN}
	Storing tools ^{FW}	An(1)	Pigs ^{Ani}		Dressing up ^{PN}
Cpd 30 (38)					
Ct(8)	Talking to friends ^{Soc}	Vr(11)	Sitting ^{Lei}	Sr(5)	Listening to radio ^{Soc}
	Conversing with family ^{Soc}		Receiving guests ^{Soc}		Conversing with family ^{Soc}
	Laundry ^{PN}		Talking to friends ^{Soc}		Receiving guests ^{Soc}
	Bagging farm produce ^{FW}		Conversing with family ^{Soc}		Talking to friends ^{Soc}
	Storing food/farm produce ^{FW}		Eating meals ^{Eat}	Dr(1)	Watching TV ^{Soc}
	Storing tools ^{FW}		Play (children) ^{Lei}	Br(3)	Eating meals ^{Eat}
	Maintenance (tools) ^{Oth}		Sitting ^{Lei}		Sleeping at night ^{PN}
	Threshing grain ^{FFP}		Preparing groundnuts ^{FFP}		Dressing up ^{PN}
An(1)	Poultry ^{Ani}		Preparing condiments ^{FFP}		Afternoon nap ^{Lei}
Kt(2)	Indoor cooking ^{FFP}		Preparing vegetables ^{FFP}	Ø (3)	Receiving guests ^{Soc}
	Storing food/farm produce ^{FW}		Washing up ^{FFP}		Conversing with family ^{Soc}
St(2)	Storing tools ^{FW}	Vp(2)	Bathing ^{PN}		Talking to friends ^{Soc}
	Storing food/farm produce ^{FW}		Toilet ^{PN}		
Cpd 31 (37)					
Ct(20)	Receiving guests ^{Soc}		Growing crops/vegetables ^{FW}	Vr(2)	Sitting ^{Lei}
	Conversing with family ^{Soc}		Maintenance (tools, walls) ^{Oth}		Afternoon nap ^{Lei}
	Talking to friends ^{Soc}		Preparing groundnuts ^{FFP}	Kt(2)	Indoor cooking ^{FFP}
	Laundry ^{PN}		Preparing condiments ^{FFP}		Preparing condiments ^{FFP}
	Eating snacks ^{Eat}		Preparing vegetables ^{FFP}	St(1)	Storing food/farm produce ^{FW}
	Eating meals ^{Eat}		Washing up ^{FFP}	Vp(2)	Bathing ^{PN}
	Afternoon nap ^{Lei}		Threshing grain ^{FFP}		Toilet ^{PN}
	Play (children) ^{Lei}		Outdoor cooking ^{FFP}	Sr(6)	Listening to radio ^{Soc}
	Sitting ^{Lei}	Br(2)	Sleeping at night ^{PN}		Conversing with family ^{Soc}
	Bagging farm produce ^{FW}		Dressing up ^{PN}		Receiving guests ^{Soc}
	Storing food/farm produce ^{FW}	Ø (1)	Play (children) ^{Lei}		Watching TV ^{Soc}
	Storing tools ^{FW}	An(1)	Goats ^{Ani}		Sleeping at night ^{PN}
					Eating meals ^{Eat}
Cpd 32 (40)					
Ct(20)	Conversing with family ^{Soc}		Maintenance (tools, walls) ^{Oth}	Sr(6)	Listening to radio ^{Soc}
	Receiving guests ^{Soc}		Preparing groundnuts ^{FFP}		Conversing with family ^{Soc}
	Talking to friends ^{Soc}		Preparing condiments ^{FFP}		Receiving guests ^{Soc}
	Listening to radio ^{Soc}		Preparing vegetables ^{FFP}		Watching TV ^{Soc}
	Laundry ^{PN}		Washing up ^{FFP}		Talking to friends ^{Soc}
	Eating snacks ^{Eat}		Threshing grain ^{FFP}		Eating meals ^{Eat}
	Eating meals ^{Eat}		Outdoor cooking ^{FFP}	Br(3)	Sleeping at night ^{PN}
	Sitting ^{Lei}	Vr(6)	Listening to radio ^{Soc}		Dressing up ^{PN}
	Afternoon nap ^{Lei}		Conversing with family ^{Soc}		Indoor cooking ^{FFP}
	Bagging farm produce ^{FW}		Talking to friends ^{Soc}	Rm(2)	Storing tools ^{FW}
	Storing food/farm produce ^{FW}		Eating snacks ^{Eat}		Storing food/farm produce ^{FW}
	Storing tools ^{FW}		Play (children) ^{Lei}	An(1)	Sheep ^{Ani}
	Growing crops/vegetables ^{FW}		Sitting ^{Lei}	Bt(1)	Bathing ^{PN}
				Vp(1)	Toilet ^{PN}
Cpd 33 (47)					
Ct(18)	Conversing with family ^{Soc}		Outdoor cooking ^{FFP}	Sr(5)	Listening to radio ^{Soc}
	Receiving guests ^{Soc}		Poultry ^{Ani}		Conversing with family ^{Soc}
	Talking to friends ^{Soc}		Maintenance (tools, walls) ^{Oth}		Receiving guests ^{Soc}
	Laundry ^{PN}	Vr(10)	Receiving guests ^{Soc}		Watching TV ^{Soc}
	Eating snacks ^{Eat}		Conversing with family ^{Soc}		Talking to friends ^{Soc}
	Eating meals ^{Eat}		Talking to friends ^{Soc}	Dr(2)	Eating meals ^{Eat}
	Sitting ^{Lei}		Eating snacks ^{Eat}		Reading/paperwork ^{Oth}
	Play ^{Lei}		Play (children) ^{Lei}	Br(3)	Sleeping at night ^{PN}
	Bagging farm produce ^{FW}		Sitting ^{Lei}		Dressing up ^{PN}
	Storing food/farm produce ^{FW}		Afternoon nap ^{Lei}		Eating meals ^{Eat}
	Storing tools ^{FW}		Preparing groundnuts ^{FFP}	Rm(2)	Storing tools ^{FW}
	Growing crops/vegetables ^{FW}		Preparing condiments ^{FFP}		Storing food/farm produce ^{FW}
	Preparing groundnuts ^{FFP}		Preparing vegetables ^{FFP}	An(2)	Sheep ^{Ani}
	Washing up ^{FFP}	Kt(3)	Indoor cooking ^{FFP}		Sheep ^{Ani}

	Threshing grain ^{FFP}		Preparing condiments ^{FFP}	Vp(2)	Bathing ^{PN}
			Preparing vegetables ^{FFP}		Toilet ^{PN}
Cpd 34 (39)					
Ct (17)	Conversing with family ^{Soc}		Preparing condiments ^{FFP}	Kt(3)	Indoor cooking ^{FFP}
	Talking to friends ^{Soc}		Threshing grain ^{FFP}		Preparing condiments ^{FFP}
	Listening to radio ^{Soc}		Cattle ^{Ani}		Preparing vegetables ^{FFP}
	Laundry ^{PN}		Maintenance (tools, walls) ^{Oth}	Sr (10)	Listening to radio ^{Soc}
	Play ^{Lei}	Vr(3)	Conversing with family ^{Soc}		Conversing with family ^{Soc}
	Bagging farm produce ^{FW}		Eating snacks ^{Eat}		Receiving guests ^{Soc}
	Storing food/farm produce ^{FW}		Eating meals ^{Eat}		Watching TV ^{Soc}
	Storing tools ^{FW}	Vp(2)	Bathing ^{PN}		Talking to friends ^{Soc}
	Growing crops/vegetables ^{FW}		Toilet ^{PN}		Eating meals ^{Eat}
	Preparing groundnuts ^{FFP}	Br(4)	Sleeping at night ^{PN}		Play ^{Lei}
	Outdoor cooking ^{FFP}		Dressing up ^{PN}		Sitting ^{Lei}
	Washing up ^{FFP}		Storing food/farm produce ^{FW}		Storing food/farm produce ^{FW}
	Preparing vegetables ^{FFP}		Afternoon nap ^{Lei}		Bagging farm produce ^{FW}
Cpd 35 (48)					
Ct (19)	Conversing with family ^{Soc}		Outdoor cooking ^{FFP}	Br(5)	Sleeping at night ^{PN}
	Talking to friends ^{Soc}		Washing up ^{FFP}		Dressing up ^{PN}
	Listening to radio ^{Soc}		Grinding machine ^{Eco}		Eating meals ^{Eat}
	Receiving guests ^{Soc}	Vr(9)	Conversing with family ^{Soc}		Afternoon nap ^{Lei}
	Laundry ^{PN}		Receiving guests ^{Soc}		Prayers ^{PN}
	Play ^{Lei}		Talking to friends ^{Soc}	Sh(1)	Selling provisions ^{Eco}
	Sitting ^{Lei}		Eating snacks ^{Eat}	Kt(3)	Indoor cooking ^{FFP}
	Afternoon nap ^{Lei}		Eating meals ^{Eat}		Preparing condiments ^{FFP}
	Bagging farm produce ^{FW}		Prayers ^{PN}		Preparing vegetables ^{FFP}
	Storing food/farm produce ^{FW}		Sitting ^{Lei}	An(1)	Sheep ^{Ani}
	Storing tools ^{FW}		Preparing vegetables ^{FFP}	Wc(2)	Toilet ^{PN}
	Maintenance (tools, walls) ^{Oth}		Preparing condiments ^{FFP}		Bathing ^{PN}
	Preparing groundnuts ^{FFP}	Sr(4)	Listening to radio ^{Soc}	Vp(2)	Toilet ^{PN}
	Threshing grain ^{FFP}		Conversing with family ^{Soc}		Bathing ^{PN}
	Preparing vegetables ^{FFP}		Receiving guests ^{Soc}	St(2)	Bagging farm produce ^{FW}
	Preparing condiments ^{FFP}		Watching TV ^{Soc}		Storing food/farm produce ^{FW}
Cpd 36 (41)					
Ct (13)	Conversing with family ^{Soc}		Receiving guests ^{Soc}		Receiving guests ^{Soc}
	Laundry ^{PN}		Listening to radio ^{Soc}		Watching TV ^{Soc}
	Bagging farm produce ^{FW}		Eating snacks ^{Eat}		Talking to friends ^{Soc}
	Storing food/farm produce ^{FW}		Eating meals ^{Eat}		Afternoon nap ^{Lei}
	Storing tools ^{FW}		Play ^{Lei}		Eating meals ^{Eat}
	Growing crops/vegetables ^{FW}		Sitting ^{Lei}	Br(4)	Sleeping at night ^{PN}
	Maintenance (tools, walls) ^{Oth}		Preparing vegetables ^{FFP}		Dressing up ^{PN}
	Preparing groundnuts ^{FFP}		Preparing condiments ^{FFP}		Talking to friends ^{Soc}
	Threshing grain ^{FFP}	Vp(1)	Toilet ^{PN}		Afternoon nap ^{Lei}
	Preparing vegetables ^{FFP}	Bt(1)	Bathing ^{PN}	An(1)	Sheep ^{Ani}
	Preparing condiments ^{FFP}	Rm(2)	Storing tools ^{FW}	Kt(3)	Indoor cooking ^{FFP}
	Outdoor cooking ^{FFP}		Storing food/farm produce ^{FW}		Preparing condiments ^{FFP}
	Washing up ^{FFP}		Listening to radio ^{Soc}		Preparing vegetables ^{FFP}
Vr(9)	Conversing with family ^{Soc}	Sr (7)	Conversing with family ^{Soc}		
Cpd 37 (30)					
Ct (22)	Conversing with family ^{Soc}		Bagging farm produce ^{FW}		Outdoor cooking ^{FFP}
	Talking to friends ^{Soc}		Storing food/farm produce ^{FW}	Br(3)	Washing up ^{FFP}
	Listening to radio ^{Soc}		Storing tools ^{FW}		Sleeping at night ^{PN}
	Receiving guests ^{Soc}		Growing crops/vegetables ^{FW}		Dressing up ^{PN}
	Laundry ^{PN}		Poultry ^{Ani}		Eating meals ^{Eat}
	Eating snacks ^{Eat}		Maintenance (tools, walls) ^{Oth}	Rm(2)	Storing tools ^{FW}
	Eating meals ^{Eat}		Preparing groundnuts ^{FFP}		Storing food/farm produce ^{FW}
	Play ^{Lei}		Threshing grain ^{FFP}	Vp(1)	Toilet ^{PN}
	Sitting ^{Lei}		Preparing vegetables ^{FFP}	Bt(1)	Bathing ^{PN}
	Afternoon nap ^{Lei}		Preparing condiments ^{FFP}	An(1)	Goats ^{Ani}

Cpd 38 (48)					
Ct (19)	Conversing with family ^{Soc}	Sr(6)	Preparing condiments ^{FFP}	Wc(2)	Toilet ^{PN}
	Talking to friends ^{Soc}		Play ^{Lei}		Bathing ^{PN}
	Listening to radio ^{Soc}		Sitting ^{Lei}	Bt(1)	Bathing ^{PN}
	Receiving guests ^{Soc}		Listening to radio ^{Soc}	St(2)	Storing tools ^{FW}
	Laundry ^{PN}		Conversing with family ^{Soc}		Storing food/farm produce ^{FW}
	Eating snacks ^{Eat}		Receiving guests ^{Soc}	Kt(3)	Indoor cooking ^{FFP}
	Bagging farm produce ^{FW}		Watching TV ^{Soc}		Preparing condiments ^{FFP}
	Storing food/farm produce ^{FW}		Talking to friends ^{Soc}		Preparing vegetables ^{FFP}
	Storing tools ^{FW}		Eating meals ^{Eat}	An(3)	Sheep ^{Ani}
	Growing crops/vegetables ^{FW}	Sleeping at night ^{PN}		Pigs ^{Ani}	
	Cattle ^{Ani}	Dressing up ^{PN}		Pigeons ^{Ani}	
	Preparing groundnuts ^{FFP}	Talking to friends ^{Soc}	Cp(2)	Storing tools ^{FW}	
	Threshing grain ^{FFP}	Conversing with family ^{Soc}		Storing food/farm produce ^{FW}	
	Outdoor cooking ^{FFP}	Receiving guests ^{Soc}	Rm(1)	Poultry ^{Ani}	
	Washing up ^{FFP}	Eating meals ^{Eat}	Dr(2)	Eating snacks ^{Eat}	
	Preparing vegetables ^{FFP}	Afternoon nap ^{Lei}		Eating meals ^{Eat}	
Cpd 39 (38)					
Ct (12)	Conversing with family ^{Soc}	Vr(4)	Eating snacks ^{Eat}		Receiving guests ^{Soc}
	Talking to friends ^{Soc}		Eating meals ^{Eat}		Talking to friends ^{Soc}
	Receiving guests ^{Soc}		Sitting ^{Lei}	St(1)	Storing food/farm produce ^{FW}
	Laundry ^{PN}	Sr(6)	Conversing with family ^{Soc}	Kt(3)	Indoor cooking ^{FFP}
	Eating snacks ^{Eat}		Listening to radio ^{Soc}		Preparing condiments ^{FFP}
	Storing food/farm produce ^{FW}		Conversing with family ^{Soc}		Preparing vegetables ^{FFP}
	Storing tools ^{FW}		Receiving guests ^{Soc}	Vp(1)	Toilet ^{PN}
	Preparing vegetables ^{FFP}		Watching TV ^{Soc}	Bt(1)	Bathing ^{PN}
	Preparing condiments ^{FFP}		Talking to friends ^{Soc}	Br(2)	Sleeping at night ^{PN}
	Outdoor cooking ^{FFP}	Eating meals ^{Eat}		Dressing up ^{PN}	
	Washing up ^{FFP}	Ø (5)	Play (children) ^{Lei}	Sh(3)	Selling provisions ^{Eco}
	Sitting ^{Lei}		Sitting ^{Lei}		Hair salon ^{Eco}
	Braiding hair ^{PN}			Sewing ^{Eco}	
Cpd 40 (36)					
Ct (20)	Conversing with family ^{Soc}	Sr(6)	Storing tools ^{FW}	Vp(2)	Watching TV ^{Soc}
	Talking to friends ^{Soc}		Growing crops/vegetables ^{FW}		Talking to friends ^{Soc}
	Receiving guests ^{Soc}		Maintenance (tools, walls) ^{Oth}		Eating meals ^{Eat}
	Listening to radio ^{Soc}		Threshing grain ^{FFP}		Toilet ^{PN}
	Laundry ^{PN}		Preparing vegetables ^{FFP}		Bathing ^{PN}
	Braiding hair ^{PN}		Preparing condiments ^{FFP}	Br(5)	Sleeping at night ^{PN}
	Eating snacks ^{Eat}		Outdoor cooking ^{FFP}		Dressing up ^{PN}
	Eating meals ^{Eat}		Washing up ^{FFP}		Prayers ^{PN}
	Play (children) ^{Lei}		Sewing ^{Eco}		Conversing with family ^{Soc}
	Sitting ^{Lei}		Listening to radio ^{Soc}	Rm(2)	Afternoon nap ^{Lei}
	Bagging farm produce ^{FW}		Conversing with family ^{Soc}		Storing tools ^{FW}
	Storing food/farm produce ^{FW}		Talking to friends ^{Soc}		Storing food/farm produce ^{FW}
	Cpd 41 (44)				
Ct (21)	Conversing with family ^{Soc}	Sr(9)	Preparing groundnuts ^{FFP}		Dr(1)
	Talking to friends ^{Soc}		Threshing grain ^{FFP}	Br(5)	Sleeping at night ^{PN}
	Receiving guests ^{Soc}		Outdoor cooking ^{FFP}		Dressing up ^{PN}
	Laundry ^{PN}		Washing up ^{FFP}		Talking to friends ^{Soc}
	Braiding hair ^{PN}		Preparing vegetables ^{FFP}		Conversing with family ^{Soc}
	Eating snacks ^{Eat}		Preparing condiments ^{FFP}		Afternoon nap ^{Lei}
	Eating meals ^{Eat}		Listening to radio ^{Soc}	St(1)	Storing food/farm produce ^{FW}
	Play (children) ^{Lei}		Conversing with family ^{Soc}	An(2)	Sheep ^{Ani}
	Sitting ^{Lei}		Talking to friends ^{Soc}		Poultry ^{Ani}
	Bagging farm produce ^{FW}		Watching TV ^{Soc}	Kt(3)	Indoor cooking ^{FFP}
	Storing food/farm produce ^{FW}		Receiving guests ^{Soc}		Preparing condiments ^{FFP}
	Storing tools ^{FW}		Eating snacks ^{Eat}		Preparing vegetables ^{FFP}
	Growing crops/vegetables ^{FW}		Eating meals ^{Eat}	Wc(2)	Toilet ^{PN}
	Maintenance (tools, walls) ^{Oth}		Dressing children up ^{PN}		Bathing ^{PN}
	Sheep ^{Ani}		Sitting ^{Lei}		

Cpd 42 (36)			
Ct (17)	Conversing with family ^{Soc}	Preparing groundnuts ^{FFP}	Play (children) ^{Lei}
	Laundry ^{PN}	Outdoor cooking ^{FFP}	Sitting ^{Lei}
	Play (children) ^{Lei}	Threshing grain ^{FFP}	Eating meals ^{Eat}
	Bagging farm produce ^{FW}	Washing up ^{FFP}	Sleeping at night ^{PN}
	Storing food/farm produce ^{FW}	Braiding hair ^{PN}	Dressing up ^{PN}
	Storing tools ^{FW}	Listening to radio ^{Soc}	Afternoon nap ^{Lei}
	Growing crops/vegetables ^{FW}	Conversing with family ^{Soc}	Indoor cooking ^{FFP}
	Cattle ^{Ani}	Talking to friends ^{Soc}	Preparing condiments ^{FFP}
	Maintenance (tools, walls) ^{Oth}	Watching TV ^{Soc}	Toilet ^{PN}
	Eating sugarcane, snacks ^{Eat}	Receiving guests ^{Soc}	Toilet ^{PN}
	Preparing vegetables ^{FFP}	Eating snacks ^{Eat}	Bathing ^{PN}
	Preparing condiments ^{FFP}	Eating meals ^{Eat}	Storing farm produce ^{FW}
Cpd 43 (30)			
Ct (17)	Conversing with family ^{Soc}	Preparing vegetables ^{FFP}	Watching TV ^{Soc}
	Laundry ^{PN}	Preparing condiments ^{FFP}	Receiving guests ^{Soc}
	Play (children) ^{Lei}	Preparing groundnuts ^{FFP}	Eating snacks ^{Eat}
	Bagging farm produce ^{FW}	Outdoor cooking ^{FFP}	Eating meals ^{Eat}
	Storing food/farm produce ^{FW}	Threshing grain ^{FFP}	Storing farm produce ^{FW}
	Storing tools ^{FW}	Washing up ^{FFP}	Sleeping at night ^{PN}
	Growing crops/vegetables ^{FW}	Braiding hair ^{PN}	Dressing up ^{PN}
	Cattle ^{Ani}	Listening to radio ^{Soc}	Storing farm produce ^{FW}
	Maintenance (tools, walls) ^{Oth}	Conversing with family ^{Soc}	Toilet ^{PN}
	Eating sugarcane, snacks ^{Eat}	Talking to friends ^{Soc}	Bathing ^{PN}
Cpd 44 (38)			
Ct (15)	Conversing with family ^{Soc}	Outdoor cooking ^{FFP}	Eating meals ^{Eat}
	Talking to friends ^{Soc}	Threshing grain ^{FFP}	Play (children) ^{Lei}
	Receiving guests ^{Soc}	Washing up ^{FFP}	Sitting ^{Lei}
	Bagging farm produce ^{FW}	Listening to radio ^{Soc}	Sleeping at night ^{PN}
	Storing food/farm produce ^{FW}	Conversing with family ^{Soc}	Dressing up ^{PN}
	Storing tools ^{FW}	Talking to friends ^{Soc}	Braiding hair ^{PN}
	Growing crops/vegetables ^{FW}	Watching TV ^{Soc}	Toilet ^{PN}
	Laundry ^{PN}	Receiving guests ^{Soc}	Bathing ^{PN}
	Maintenance (tools, walls) ^{Oth}	Eating snacks, sugarcane ^{Eat}	Indoor cooking ^{FFP}
	Preparing vegetables ^{FFP}	Eating meals ^{Eat}	Preparing condiments ^{FFP}
	Preparing condiments ^{FFP}	Preparing vegetables ^{FFP}	Preparing vegetables ^{FFP}
	Preparing groundnuts ^{FFP}	Reading/paperwork ^{Oth}	Storing farm produce ^{FW}
		Toilet ^{PN}	Storing tools ^{FW}
Cpd 45 (31)			
Ct (15)	Conversing with family ^{Soc}	Preparing condiments ^{FFP}	Eating snacks, sugarcane ^{Eat}
	Talking to friends ^{Soc}	Outdoor cooking ^{FFP}	Eating meals ^{Eat}
	Laundry ^{PN}	Washing up ^{FFP}	Storing farm produce ^{FW}
	Bagging farm produce ^{FW}	Selling firewood ^{Eco}	Nap ^{Lei}
	Storing food/farm produce ^{FW}	Maintenance (tools, walls) ^{Oth}	Sitting ^{Lei}
	Storing tools ^{FW}	Listening to radio ^{Soc}	Sleeping at night ^{PN}
	Growing crops/vegetables ^{FW}	Conversing with family ^{Soc}	Dressing up ^{PN}
	Poultry ^{Ani}	Talking to friends ^{Soc}	Nap ^{Lei}
	Preparing groundnuts ^{FFP}	Watching TV ^{Soc}	Toilet ^{PN}
	Preparing vegetables ^{FFP}	Receiving guests ^{Soc}	Bathing ^{PN}
			Sheep ^{Ani}

APPENDIX 11: Use of space, activities and functions for compound heads and their spouses

S/ No	Compound Head, CH					CH's Wife				
	Receiving guests	Eating	Resting/ sleeping	Leisure	Most used space, CH	Receiving guests	Cooking/ food prep	Washing up	Leisure	Most used space, Spouse
1 st typology										
1	Ent, Φ*	Ent, Φ	Ent, Φ	Ent, Φ	Ent, Φ	Br	Cty, Kit	Cty	Br	Cty
2 nd typology										
2	Cty	Cty	Cty, Sr	outside cpd	Cty	N. A. Widower				
3	Cty	Sr	Br	Cty	Cty	N.A. Bedridden				
4	Ent, φ	Ver/ Cty	Ver/Cty	Ent, φ	Ver/Cty	N.A. Widower				
5	Ent, φ	Visitor's hut	Br	Ent, φ	Ent, φ	Cty	Cty, Kit	Cty/ borehole	Cty	Cty
6	Sr	Sr	Br	outside cpd	Cty, Φ	Sr, Ver	Cty	Cty	Br	Cty
7	Cty	Sr	Br	Ent, φ	Ent, φ	Cty	Cty, Kit	Cty/ borehole	Ent, φ	Cty
8	Cty, Ver	Ver	Br	Ent, Φ	Ent, Φ; Cty	Cty	Cty	Cty	Cty	Cty
9	Sr, Ent, φ	Ver/Cty	Br	Ent, φ	Ent, φ	Ent, φ; Sr	Ver/Cty	Cty	Ent, φ	Cty
10	Sr	Ver, Sr	Br	Cty	Ver, Cty	Sr	Cty	Ver, Cty	Cty	Cty
11	Cty	Ver/Cty	Br	Ent, φ	Cty	Ver, Cty	Cty, kit	Cty	N.A. Widow	
12	Ent, Φ	Br	Br	Ent, Φ	Ent, Φ	N. A. Widower				
13	Sr	Sr	Sr	outside cpd	Sr	Sr, Ver	Kit	Cty	Br	Cty, Ver
14	Ent, φ	Ent, φ	Br	Ent, φ	Ent, φ	Ent, φ, Cty	Cty	Cty/ borehole	Cty	Cty
15	Cty	Cty	Br	Ent, Φ	Ent, Φ	Cty	Kit, Cty	Cty	Cty	Cty
16	Sr	Dr	Br	outside cpd	Ver, Cty	Sr	Cty	Sr	Cty	Cty, Ver
17	Sr	Ver, Cty	Br	outside cpd	Ent, Φ	Ver, Cty	Cty	Cty	Cty	Cty
18	Sr	Ver, Sr	Br	Ver	Ver	Ver, Sr	Kit, Cty	Cty	Br	Cty, Ver
19	Cty	Cty	Br	Cty	Cty	Ver, Cty	Kit, Cty	Cty	Br	Cty
20	Cty	Sr	Cty, Br	outside cpd	Cty	Cty	Cty	Cty	Br	Cty
21	Ent, φ	Ent, φ	Ent, φ	Ent, φ	Ent, φ	Cty	Cty, Kit	Cty	Ent, φ	Cty
22	Ent, φ	Ent, φ	Ent, φ ; Br	Ent, φ	Ent, φ	Cty	Cty	Cty	Cty	Cty
23	Cty, Sr	Sr	Cty, Br	Ent, φ	Cty, Sr	Sr	Kit	Cty	Br	Cty
24	Cty, Ver	Ver	Br	Ver, Cty	Ver	N. A. Widower				
25	Sr, Cty	Sr	Cty, Sr	outside cpd	Cty	Cty	Kit	Cty	Cty, Br	Cty
26	Ent, φ	Cty	Br	outside cpd	Ent, φ	Sr, Cty	Cty	Cty	Ent, φ	Ent, φ
27	Cty	Cty	Cty	outside cpd	Cty	Cty	Cty	Cty	Cty, Br	Cty
28	Ver; Ent, φ	Ent, φ	Br	Ent, φ	Ent, φ	Cty	Cty	Cty	Cty	Cty
29	Cty	Sr	Br	Ent, φ	Ent, φ	Cty	Cty, Kit	Cty/ borehole	Ent, φ	Cty
30	Sr	Sr	Br	outside cpd	Sr		Cty, Kit	Cty	Cty	Cty
31	Sr, Ver	Sr	Br	outside cpd	Ver	Sr	Cty, Kit	Cty, Sr	Cty, Ver	Cty
32	Sr, Ent, φ	Cty	Br	outside cpd	Sr	N. A. Separated				
33	Sr	Dr	Br	outside cpd	Dr	Sr, Cty	Kit, Cty	Cty	Br	Cty
34	Sr, Ver	Sr, Ver	Br	outside cpd	Ver	Sr	Kit, Cty	Cty	Br, Cty	Cty

<i>3rd typology</i>										
35	Sr	Sr, Cty	Br	outside cpd	Sr	Sr, Cty	Cty, Kit	Cty	Cty, Br	Cty
36	Ver	Ver	Br	outside cpd	Ver	Sr	Cty, Kit	Cty	Br	Ver
37	Cty	Cty	Cty, Br	Cty	Cty	Cty	Kit	Cty	Cty	Cty
38	Sr	Sr	Br	Br	Sr	Sr	Kit	Cty	Br, Cty	Cty
39	Sr, Ent, φ	Sr	Br	Ent, φ	Ent, φ; Sr	N.A.	Cty	Cty	N.A. Widow	
40	Sr, Cty	Sr, Cty	Br	outside cpd	Cty	Sr	Cty	Cty	Br	Cty
<i>4th typology</i>										
41	Sr	Dr	Br	Ent, φ	Sr	N.A	Cty, Kit	Cty	N.A. Widow	
42	Sr	Dr	Br	outside cpd	Sr	Sr	Cty, Kit	Cty	Br	Cty
43	Sr	Sr	Br	Sr	Sr	N. A.	Cty, Kit	Cty	N. A. Widow	
44	Sr	Sr	Br	Sr	Sr	Sr	Cty	Cty	Br	Cty
45	Ent, φ	Sr	Br	Ent, φ	Ent, φ	N.A.	Cty	Cty	N.A. Widow	

*O = outside space

APPENDIX 12: Demographics (Educational background, income and occupation)

S/ No	Educ. Status CH/spouse	Children	Location of Schools		Income per month		Income Occupation	Source(s)
	CH/spouse	Children	CH/spouse	Children	N	\$		
<i>1st typology</i>								
1	Primary Sch.	Sec. Sch.	Billiri	Tula	5,000	31.76	Night watchman	Salary, farming
<i>2nd typology</i>								
2	Post Sec.	Post Sec.	Nig. Army Corps	Kaltungo, Billiri	40,000	254.08	Retired Soldier	Pension, petty business, farming
3	---	Sec. Sch.	---	Billiri	3,000	19.056	N. A. Too old to work	Support from children
4	--- N. A. (widower)	Sec. Sch.	---	Billiri	3,000	19.056	N. A. too old to work	Support from children
5	Primary Sch.	Sec. Sch.	Billiri	Billiri	10,000	63.52	Night watchman	Salary, farming
6	Primary Sch. Post Sec.	N.A.	--- Sch. Of Health Tech.	N.A.	20,000	127.04	Business, Health attendant	Business, farming, animal sales, salary
7	---	Sec. Sch.	---	Billiri	25,000	97.3	Businessman	Petty trading, farming
8	---	Post Sec.	---	Bible Coll. Kufai-Billiri	3,000	19.056	N. A. too old to work (CH)	Stipends from children, farming (spouses)
9	Post Sec. Post Sec.	Nursery Sch.	Bauchi	Billiri	15,000	95.28	Farmer, Civil Servant	Sale of farm produce, salary
10	Sec. Sch. Sec. Sch.	Sec. Sch.	Jama'are	Gombe	60,000	381.12	Hospital attendant	Salary, farming
11	N.A. (widow) Primary Sch.	Sec. Sch.	Billiri	Billiri	12,000	46.7	Civil Servant	Salary, farming
12	---	Sec. Sch.	---	Potiskum, Gombe	5,000	31.76	N. A. too old to work	Stipends from children
13	Skills acquisition, Sec. Sch.	Primary Sch.	Adv. Tech Coll. Misau	Billiri	40,000	254.08	Builder	Business, farming
14	Other (Adult literacy class)	Sec. Sch.	Billiri	Billiri	15,000	95.28	Handyman	Salary, farming
15	Primary Sch. ---	Post Sec.	Amtawalam -Billiri, ---	Azare, Numan	3,000	19.056	N. A. too old to work	Stipends from children
16	Post Sec.	Sec. Sch.	Coll. Of Educ., Azare	Billiri	28,000	177.86	Civil Servant	Salary, farming
17	---	Post Sec.	---	Kagoro, Dukku, Ladongor, Gombe	8,300	52.72	Farmer	Farming
18	Sec. Sch. Sec. Sch.	Primary Sch.	Bagauda, Ogbomosho	Billiri	30,000	190.56	Businessman	Business
19	Primary Sch. Primary Sch.	Sec. Sch.	Billiri	Kuri	8,000	50.82	Retired preacher	Pension, stipends from children, farming
20	Sec. Sch. Sec. Sch.	Primary Sch.	Billiri	Billiri	25,000	158.8	Mechanic	Business, farming
21	Other (Adult literacy class)	Sec. Sch.	Billiri	Kaltungo, Pindiga, Tula, Billiri	8,000	50.82	Farmer	Farming

22	Primary Sch. Primary Sch.	Post Sec.	Kaduna,	University (Yola), Billiri, Coll. Of Adv. Studies, Kumo	50,000	317.6	Businessman	Business, farming
23	Post Sec. Sec. Sch.	Primary Sch.	Coll. Of Educ. Yola, Billiri	Billiri	31,000	196.9	Civil Servant, builder	Salary, business, farming
24	Primary Sch. N.A.	Post Sec.	Nig. Army Corps, Zaria	Gombe, Plateau	35,000	222.3	Pensioner	Pension, petty business
25	Post Sec. Post Sec.	Post Sec.	University (Maiduguri, Jos)	Polytechnic (Mubi)	46,000	292.19	Civil Servants	Salaries, farming
26	---	Sec. Sch.	---	Ladongor, Billiri	4,000	25.4	Farmer	Farming
27	Primary Sch. Primary Sch.	Sec. Sch.	Ladongor, Billiri	Kalmali	20,000	127.04	Farmer	Farming
28	Post Sec. ---	Sec. Sch.	Arabic Teachers Coll. Billiri	Billiri	10,000	63.52	Islamic teacher	Farming
29	Sec. Sch.	Primary Sch.	Dukku	Billiri	20,000	127.04	Farmer	Farming, animal sales (Cows, pigs and sheep),
30	Post Sec. Sec. Sch.	Post Sec.	University (Kano, Zaria)	Billiri	90,000	571.68	Civil servants	Salaries, sale of farm produce, retail business
31	Sec. Sch. Post Sec.	Sec. Sch.	Pindiga	Piyau, Billiri	30,000	105.6	Farmer, Civil Servant	Salary, farming
32	Post Sec.	Sec. Sch.	Ashaka, Billiri	Billiri	30,000	116.7	Businessman	Petty trading of provisions, farming
33	Post Sec. Primary school	Post Sec.	University (Maiduguri)	Fed. Poly Bauchi; Central, Billiri	50,000	317.6	Civil Servants	Salaries, farming, animals
34	Post Sec.	Post Sec.	Coll. Of Agric Kaba, Bauchi	Billiri	45,000	285.84	Civil Servant, hospital attendant	Salaries, farming
<i>3rd typology</i>								
35	Primary Sch. ---	Post Sec.	Police Corps, Bauchi	University (Yola, Mubi)	40,000	254.08	Pensioner, business	Pension, business, farming
36	Post Sec. Post Sec.	Post Sec.	PG courses, Coll. Of Educ. Kano, Zaria	Bauchi, Zaria	55,000	349.36	Retired company worker, retired teacher	Business, pension
37	Primary Sch. Primary Sch.	Sec. Sch.	Billiri	Billiri	12,000	76.22	Night watchman	Salary, sale of animals (pigs and sheep)
38	Post Sec. Post Sec.	Post Sec.	University (Maiduguri)	University (Bauchi)	50,000	317.6	Civil Servants	Salaries, farming, animal sales
39	N. A. (widow) Post Sec.	Post Sec.	Bauchi	University (Maiduguri, Abuja, Bauchi)	20,000	127.04	Civil Servant	Salary, renting of rooms, farming
40	Post Sec.	Primary Sch.	Potiskum	Billiri	25,000	158.8	Civil Servant, petty trading	Salary, business
<i>4th typology</i>								
41	N. A (widow) Other (Adult	Post Sec.	Billiri	University (Zaria, Abuja); Sec (Yola)	21,400	135.9	Retired civil servant	Pension, support from children, farming

literacy class)								
42	Post Sec. Sec. Sch.	Sec. Sch.	Police Corps, Kano	Billiri	30,000	190.56	Pensioner	Pension, farming
43	N. A. (widow) Primary Sch.	Post Sec.	Billiri	Sch. Of Basic Studies, Funtua; Billiri	18,000	114.34	Civil Servant	Salary, farming
44	Post Sec. Post Sec.	Primary Sch.	University (Maiduguri) ; Sch. of Nursing Bauchi	Billiri	180,000	1,143.36	Civil Servants	Salaries, farming
45	N. A. (widow) Sec. Sch.	Post Sec.	Bauchi	Billiri	21,000	133.39	Civil Servant	Salary, sale of animals (pigs and sheep)

APPENDIX 13: User preferences

S/No	Compound Head CH	Changes to compound	Most liked area/ ward	Reason	Least liked area/ ward	Reason
<i>1st typology</i>						
1	Build mud rooms with zinc roofing		Tangji	Grew up here	Labeleng	Full of foreigners
<i>2nd typology</i>						
2	Complete kit		Bare	Family clan lands	Poshiya	No family
3	Build another flat in concrete		Village areas	Proximity to farms	Urgun	Full of drunks, delinquents
4	Finish up new flat		Komta	Uncles reside there	Bare	Proximity to market
5	Build another set of rooms/ flat in concrete		Village areas	Proximity to farms	Urgun	Full of drunks, delinquents
6	Fencing entire plot with conc blocks		Awai	Home	Urgun	Delinquents, drunks
7	Finish up new concrete flat		Village areas	Proximity to farms and family	Urgun	Full of drunks, delinquents
8	Change hut to a conc structure		Lawiltu	Familiar terrain	Any town area	Difficult living conditions
9	Re-build compound in cement/ concrete		Awai	Peaceful	Goal course	Presence of foreigners
10	Complete bungalow		Awai	Better infrastructure	Villages	No good schools for children
11	Finish courtyard with concrete		Awai	Children reside there	Urgun	Full of drunks, delinquents
12	Repair leaking roof, construct fence		Labeleng	Grew up here	Anywhere else	Too old to go any where
13	Relocate and build a new house where there are no close relatives		Billiri, Komta	Peaceful	Bare	Too many foreigners
14	Build another set of rooms/ flat in concrete		Village areas	Proximity to farms	Goal course	Presence of foreigners
15	Build new conc house, get new furniture		Komta	To maintain Father's original plot	Urgun	Delinquents, drunks
16	Plaster building in cement, build more rooms		Awai	Peaceful, few foreigners	Bare	Too many foreigners
17	Build new conc house		Lawiltu	Grew up here	Anywhere else	Expensive lifestyle
18	Build new rentable apartments in conc		Anywhere in Tangale land	Peaceful	N. A.	
19	Complete new building		Awai	Good pasture for grazing animals	Urgun	Delinquents, drunks
20	Repair roof, build conc bungalow		Awai	Too be current and to see what is happening in town	Urgun	Delinquents, drunks
21	Construct conc rooms		Bare	Home	Fulani settlements	Full of foreigners
22	Demolish mud rooms and replace with conc house		Bare	Business flourishes here near market	Urgun	Delinquents, drunks
23	Plaster and paint exterior of house		Biliri	Pleasant environs	Ladukansha	Water logged, delinquents
24	Add a new conc flat/building		Awai	Peaceful	Ladukansha, Goal course	Insecurity, delinquents
25	Build more conc rooms, drill borehole		Bare	Family clan lands	Urgun	Delinquents, drunks

26	Roof new mud rooms, fence entire cpd. with conc. Blocks	Biliri	Home place	Fulani settlement	Dangerous, full of foreigners, difficult terrain
27	Construct more conc. Rooms	Bare	Personal plot	Other side of Bare	Presence of foreigners
28	Complete fencing with conc. Blocks	Awai	Peaceful	Urgun	Delinquents, drunks
29	Build another set of rooms/ flat in concrete	Village areas	Acceptance and security	Latappas	Water logged area
30	Build a new concrete structure	Awai new extension	Peaceful, quiet	Bare	No relatives live there
31	Build new conc house	Kargo	Grew up here	Billiri	Not used to other areas
32	Re-roof and finish living quarters	Labini	Home area	Urgun	Full of drunks, delinquents
33	Build new conc bungalow, over head tank for water storage	Awai	Available amenities	Urgun	Not peaceful, delinquents
34	Roof new conc. building, cement cty	Market area	Good for business	Lawalam	No security
<i>3rd typology</i>					
35	Increase headroom of rooms	Awai	Peaceful	Urgun	Delinquents, drunks
36	Add new shops along conc wall facing highway	Tangji	Settled here	Urgun	Delinquents, drunks
37	Build VIP and wall with concrete	Awai	Peaceful	Laduka	Full of drunks, delinquents
38	Add finishes like ceramic tiles	Awai	Peaceful	Urgun	Delinquents, drunks
39	Build more shops, rooms for rent	Awai	Presence of roads, water, shops	Shagari quarters	Proximity to Kaltungo
40	Put in new windows, plaster walls in conc., tile cpd	Kentengereng	Receptive to foreigners	Ladukansha	Delinquents, drunks
<i>4th typology</i>					
41	Finish courtyard with concrete	Awai	Peaceful	Goal course	Presence of foreigners
42	Build new cement house	Lawiltu	Grew up there	Anywhere else	Expensive lifestyle in Biliri
43	Build a new self contained concrete flat	Awai	Leisure spots	Village areas	Rampant cases of theft
44	Finish up conc. fence, build new shops fronting street	Kentengereng (place of residence)	Peaceful	Urgun	
45	Finish up wall and outdoor kit	Kekkel	Husband's relatives live there	Urgun, Laduka	Full of drunks, delinquents

S/No	Wife of CH	Changes to compound	Most liked area/ward	Reason	Least liked area/ward	Reason
<i>1st typology</i>						
1	Build conc flat and toilet		Kentengereng	Home	Labeleng	Presence of foreigners
<i>2nd typology</i>						
2	N. A. (widower)					
3	N. A. (Bedridden wife)					
4	N. A. (Widower)					
5	Build additional rooms		Kufai hills	Initial hill settlement area	Kanthali areas	Presence of In-laws
6	Build outdoor kit, fence plot		Kufai	Grew up there	Urgun	Delinquents, drunks
7	Finish up new structure		Village areas	Used to the env	Urgun	Drunks and delinquents
8	Cement cty		Lawiltu	Familiar env	Anywhere else	Food not easily available
9	New concrete structure		Awai	Peaceful	Village areas with rivers	Water logged areas
10	Cement cty, finish up fence, complete bungalow		Lawiltu	Security for children	Any where else	New environment
11	N. A. (Widow)					
12	N. A. (widower)					
13	Relocate in line with husband's wishes		Poshiya	Peaceful	Goal course	Too many foreigners
14	Construct VIP and gate for security		Village areas	Husband's relatives reside there	Urban areas	Insecurity
15	Rebuild fence with concrete blocks		Kargo	Familiar terrain	Anywhere else	Too old for change
16	Finish up house		Awai	Good neighbours	Goal course	Too many foreigners
17	Build new conc. bungalow		Lawiltu	Husband's choice	Anywhere else	Husband's choice
18	Build rentable rooms		Kekkel	Husband's area, used to it	Goal course	Presence of foreigners
19	Cement inner cty		Bare	Husband's clan area	Urgun	Delinquents
20	Build a new conc bungalow or flat		Bare	Husband's home	Urgun	Delinquents, drunks
21	Construct fence with blocks, separate animals in cty		Awai	Good area	Urgun	Delinquents, drunks
22	Cement entire courtyard		Bare	Home, grew up here	Urgun	Delinquents, drunks
23	Put finishes to house		Bare	Home, grew up here	Urgun	Delinquents, drunks
24	N. A. (widower)					
25	Cement floor		Bare	Husband's clan land	Urgun	Delinquents, drunks
26	Roof new structure, cement cty		Biliri	Husband's choice	Sansani (neighbouring village)	Hates crossing rivers
27	Build more conc rooms		Bare	Husband's clan land	Urgun	Delinquents, drunks
28	Add more conc rooms to compound		Bare	Husband's home	Urgun	Delinquents, drunks
29	Build new flat in compound to fit current trends		Billiri	Home place	Urgun	Drunks and delinquents
30	Build a new concrete house		Biliri areas	Husband's relatives reside there	Urgun, Laduka	Drunks and delinquents
31	Add more concrete buildings		Kargo	Grew up here	Komta	Too close to many relatives
32	Construct new concrete flat		Labini	Used to the environment	Goal course	Presence of foreigners
33	Tile Sr, build new		Awai	Peaceful	Ladukansha	Full of foreigners, not

	conc kit with tiles and sink				peaceful
34	Finish up new building, cement cty	Kilik-kilik	Availability of water	Urgun	Delinquents, drunks
<i>3rd typology</i>					
35	Open poultry within cty	Awai	Already settled here	Urgun	Delinquents, drunks
36	Build conc outdoor kit, drill borehole for water	Billiri	Home	Not sure	
37	Construct bath/VIP	Awai	Peaceful	Goal course	Presence of foreigners
38	Change furniture	Awai	Husband's area	Goal course	Perceived insecurity
39	N. A. (Widow)				
40	Plaster walls, wire house for electric supply, paint conc., finished walls	Kentengereng	Home place	Lakokdik	Open and insecure
<i>4th typology</i>					
41	N. A. (Widow)				
42	Build new conc. House	Lawiltu	Husband's choice	Anywhere	Husband's choice
43	N. A. (Widow)				
44	Finish plastering bungalow, paint, tile kit and put fittings	Kentengereng	Husband's choice	Goal course	Presence of foreigners
45	N. A. (Widow)				

APPENDIX 14: Ownership and construction methods

S/ No	Who established compound	Year built, construction method/building materials	Current owner	Method of ownership	Cost (estimated current value) N\$	
1 st typology						
1	Father	1948-2010; Mud without Finish (MwoF), Thatch	CH	Inherited/Built	---	Negligible
2 nd typology						
2	Father	1948-2002; MwoF, Mud with Cement Finish (MwCF), Mud with Tar Finish (MwTF), Concrete blocks (CB), Corrugated Iron sheets (CIS)	CH	Inherited/Built	3,000,000	19,056
3	Father	1948-2002; MwCF , Thatch, CIS	CH	Inherited/Built	45,000	285.84
4	Compound Head, CH	1948-2011; MwoF, Thatch, CIS	CH	Built	100,000	635.2
5	Father	1948-2011; MwoF, MwCF, CIS	CH	Inherited/Built	75,000	476.4
6	Father	1950-2010; MwTF, Thatch, CIS	CH	Inherited/Built	2,500,000	15,880
7	Father	1950-2010; MwCF, CB, CIS	CH	Inherited/Built	300,000	1,905.6
8	Grandfather	1950-2010; MwoF, MwTF, CB, CIS, Thatch	CH	Inherited/Built	3,000,000	19,056
9	Grandfather	1950-2011; MwoF, CIS, CB	CH	Inherited/Built	800,000	5,081.6
10	Father	1952-2011; MwoF, MwTF, CB, CIS	CH	Inherited/Built	2,500,000	15,880
11	Late husband	1960-2007; MwoF, CIS, CB, Thatch	CH (Female, F)	Inherited/Built	500,000	3,176
12	CH	1960-2007; MwTF, CIS, Thatch	CH	Inherited/Built	100,000	635.2
13	Father	1960-2011; MwoF, MwCF, MwTF, CB, CIS	CH	Inherited/Built	4,500,000	28,584
14	CH	1962-2008; MwTF, Thatch, CIS, CB	CH	Built	80,000	508.16
15	CH	1965-2008; MwTF, Thatch, CIS	CH	Bought/Built	---	Negligible
16	Father	1970-1997; CIS, CB	CH	Inherited/Built	4,500,000	28,584
17	Father	1970-2010; MwTF, CIS	CH	Inherited/Built	100,000	635.2
18	Father	1970-2011; MwoF. MwCF, CB, CIS, Thatch	CH	Inherited/Built	8,000,000	50,816
19	CH	1974-2011; MwoF, MwCF, MwTF, CB, CIS	CH	Built	4,500,000	28,584
20	Father	1974-2011; MwCF, MwoF, MwTF, CIS	CH	Inherited/Built	75,000	476.4
21	CH	1978-2010; MwCF, Thatch, CB, CIS	CH	Built	10,000	63.52
22	CH	1978-2011; MwoF, MwCF, CB, CIS	CH	Built	6,500,000	41,288
23	Mother	1978-2011; MwoF, CB, CIS	CH	Inherited/Built	2,000,000	12,704
24	CH	1979-2000; MwoF. MwCF, CB, CIS, Thatch	CH	Bought/Built	4,500,000	28,584
25	CH	1980-2011; MwoF, CB, CIS	CH	Built	5,000,000	31,760
26	Uncle	1982-2010; MwTF, CIS	CH	Inherited/Built	500,000	3,176
27	CH	1982-2011; MwTF, CB, CIS, Thatch	CH	Built	800,000	508.16
28	CH	1984-2010; MwCF, CB, CIS	CH	Bought/Built	600,000	3,811.2
29	CH	1985-2011; MwoF, MwCF, thatch,CIS	CH	Built	47,000	183
30	CH	1993-2007; MwCF, CB, CIS	CH	Built	4,500,000	28,584
31	CH	1994-2008; MwTF, MwCF,CIS, thatch	CH	Built	600,000	3,811.2
32	Father	1995-2007; MwoF, CIS, CB	CH	Built	2,000,000	7,782.1
33	CH	1999-2010; MwoF, MwCF, CB, CIS	CH	Built	6,000,000	38,112
34	CH	1999-2010; MwoF, CB, CIS	CH	Bought/Built	4,000,000	25,408
3 rd typology						
35	Father	1990-1995; CB, CIS	CH	Inherited/Built	5,000,000	31,760
36	CH	1992; CB, CIS	CH	Bought/Built	4,500,000	28,584
37	Employer	1993; CB, CIS	Employer	Bought/ Built	4,200,000	16,342
38	CH	1993; CB, CIS	CH	Bought/Built	8,000,000	50,816
39	Father-in-law	1997-2009; CB, CIS	CH (F)	Built	4,000,000	25,408
40	CH	2000-2010; CB, CIS	CH	Bought/Built	4,000,000	25,408
4 th typology						
41	Late husband	1988-2005; CB, CIS	CH (F)	Bought /Built	8,000,000	50,816
42	CH	1999-2010; CB, CIS	CH	Bought /Built	7,500,000	47,640
43	CH	2000-2009; CB, CIS	CH (F)	Bought /Built	3,500,000	13,618
44	CH	2006-2011; CB, CIS	CH	Bought /Built	8,000,000	50,816
45	CH	2009; CB, CIS	CH (F)	Bought /Built	1,100,000	4,280

APPENDIX 15: Data from prototype units

i) Integration values from Space Syntax analysis

Unit	Integration from the highest to lowest value	k-spaces
<i>Pro I</i>	Co (3.45) > Co (1.72) > Sr = Ø (0.99) > Kt = Br (0.86) > Wc = Bt (0.0.69)	8
<i>Pro II</i>	Ø (1.9) > Ct (1.88) > Dr (1.67) > Vr (1.45) > Sr (1.36) > Vr (1.29) > Kt = Br (1.07) > Wc = Cp (1.05) > Kt (1.02) > Br = Br = Bt = Wc = St (0.96) > Br = Br = Bt = Wc = Kt (0.82) > St = Wc (0.73)	22
<i>Pro II mod</i>	Ct = Sr (2.32) > Kt (1.54) > Vr (1.44) > Sr (1.35) > Ø (1.19) > Wc = Wc = St = Br = Br = Bt (1.13) > Br = Br = Br = St = Kt = Bt (0.87) > Vr (0.83) > An (0.77) > Wc (0.62)	21

ii) Observed activities and use of space, Pro II mod

Pro II mod (55)					
<i>Ct</i> (19)	Listening to radio ^{Soc}	<i>Vr</i> (9)	Receiving guests ^{Soc}	<i>Kt</i> (3)	Indoor cooking ^{FFP}
	Conversing with family ^{Soc}		Talking to friends ^{Soc}		Preparing condiments ^{FFP}
	Talking to friends ^{Soc}		Receiving guests ^{Soc}		Preparing vegetables ^{FFP}
	Receiving guests ^{Soc}		Sitting ^{Lei}	<i>Sr</i> (10)	Eating meals ^{Eat}
	Laundry ^{PN}		Play (children) ^{Lei}		Eating snacks, sugarcane ^{Eat}
	Outdoor cooking ^{FFP}		Preparing vegetables ^{FFP}		Sitting ^{Lei}
	Threshing grain ^{FFP}		Preparing condiments ^{FFP}		Preparing vegetables ^{FFP}
	Washing up ^{FFP}		Indoor cooking ^{FFP}		Preparing condiments ^{FFP}
	Preparing groundnuts ^{FFP}	<i>Br</i> (9)	Eating snacks, sugarcane ^{Eat}		Receiving guests ^{Soc}
	Preparing vegetables ^{FFP}		Sleeping at night ^{PN}		Conversing with family ^{Soc}
	Preparing condiments ^{FFP}		Dressing up ^{PN}		Listening to radio ^{Soc}
	Bagging farm produce ^{FW}		Nap ^{Lei}	<i>Ø</i> (1)	Watching TV ^{Soc}
	Storing tools ^{FW}		Receiving guests ^{Soc}		Talking to friends ^{Soc}
	Sheep ^{Ani}		Conversing with family ^{Soc}		Cattle ^{Ani}
	Poultry ^{Ani}		Listening to radio ^{Soc}		
	Cattle ^{Ani}	<i>Wc</i> (1)	Toilet ^{PN}		
	Maintenance (tools, walls) ^{Oth}	<i>Bt</i> (1)	Bathing ^{PN}		
	Eating snacks, sugarcane ^{Eat}	<i>St</i> (2)	Storing farm produce ^{FW}		
	Play (children) ^{Lei}		Storing tools/equipment ^{FW}		

iii) Assigned activities according to designed functions in Pro I and II

Pro I					
Socializing	Sr	Leisure	Br	Maintenance etc	---
Personal Needs	Br, Wc, Bt	Farm related work	---	Food preparation	Kt
Eating	Sr	Animal husbandry	---	Economic activities	---
Pro II					
Socializing	Sr	Leisure	Br, Vr	Maintenance etc	St
Personal Needs	Br, Wc, Bt	Farm related work	St, Ct	Food preparation	Kt, Ct
Eating	Dr	Animal husbandry	---	Economic activities	---

APPENDIX 16: Basic areas and measures from compounds

S/ No	Area of compound (m ²)	Open area (m ²)	No. of court yards	Av. size of courtyard (m ²)	Population of household	Av. courtyard area/ person (m ²)	Total no. of sleeping rooms	Av. size of room (m ²)	Av. no. of persons /room (population density)
<i>1st typology</i>									
1	131.4	97.4	1	93.4	3	31.13	2	8	1.5
<i>2nd typology</i>									
2	270	142.7	1	142.7	15	9.5	4	10.6	3.75
3	431	368.7	1	364.7	2	182.35	2	14.5	1
4	199	59.8	1	56.1	5	11.22	3	9.27	1.67
5	391	337	1	333.6	9	37.06	3	10.26	3
6	838.2	661.5	2	326.85	7	93.39	3	14	2.3
7	328.8	226.3	2	113	15	45.26	5	8.58	3
8	422.8	279.6	4	68	7	38.8	7	11.7	1
9	342.18	236.9	1	230.9	6	76.97	2	13.1	3
10	318.8	163.4	2	77.85	10	15.57	2	15.3	5
11	233.2	143.4	2	65.88	2	65.88	2	12	1
12	376.8	302	1	299	3	99.67	2	13.25	1.5
13	204.5	82.9	1	82.9	7	11.8	3	11.6	2.3
14	300.4	232	1	230	8	28.75	2	11.1	4
15	174.85	128.7	1	128.7	3	42.9	2	13.2	1.5
16	788.7	621.3	1	618.6	8	77.3	3	13.97	2.67
17	781.9	690	2	345	6	115	5	8.82	1.2
18	745.86	532	4	128.4	9	57	6	11.08	1.5
19	2010.85	931	3	307	18	51.17	9	11.6	2
20	261.9	187.6	1	187.6	11	17.05	2	11.5	5.5
21	432.4	306.3	1	297.8	8	37.23	3	10.26	2.67
22	488	203.8	3	65	18	10.83	9	10.7	2
23	232.1	130.7	2	62.35	6	20.78	1	11.8	6
24	1062.2	785	1	771.8	4	192.95	5	10.7	0.8
25	492.7	390	2	198.65	8	49.66	2	19.25	4
26	367.8	307.4	1	297.9	4	74.48	2	12.95	2
27	403.6	277	1	272	14	19.4	4	9.6	3.5
28	677.4	543.5	3	179.5	24	22.33	6	11.57	4
29	653.35	565.5	1	557.6	4	139.25	3	8.47	1.33
30	303.1	135	1	120.5	10	12.05	4	13.5	2.5
31	198.6	125.2	1	118.5	7	16.93	2	10.7	3.5
32	640	491.4	2	241.55	6	80.5	6	11	1
33	511	303	2	151.5	9	33.67	3	13.2	3
34	404.7	241	1	241	10	24.1	2	12.5	5
<i>3rd typology</i>									
35	655.7	361.9	1	333	12	27.75	7	16.4	1.7
36	486.2	295.3	2	142.7	5	57.08	3	15.9	1.67
37	960	808.25	1	808.25	12	67.35	8	11.15	1.5
38	1101.7	729.4	2	364.7	9	81	5	15.1	1.8
39	430	162.6	1	162.6	11	14.78	7	14.23	1.57
40	476	401	1	394.5	6	65.75	4	9.475	1.5
<i>4th typology</i>									
41	918	734.34	1	728	7	104	4	13.55	1.75
42	846.7	646.43	1	646.43	5	129.3	3	14.73	1.67
43	407.8	257.4	1	251.5	12	20.95	5	13.5	2.4
44	831.8	597.3	1	595	4	148.75	3	19.06	1.33
45	255.2	167.33	1	167.3	3	55.77	2	11.5	1.5
Av.	528.6	364.3	1.5	274.9	8.3	58	3.8	12.3	2.4

APPENDIX 17: Infrastructure and social amenities

S/ No	Light	Electricity supply	Water supply	Ventilation	Waste disposal	Link to compound (cpd)
<i>1st typology</i>						
1	Good	Erratic; petrol fuelled generator	Buy/fetch from nearby borehole 100m from cpd	Very Good	Burnt within compound	Footpath
<i>2nd typology</i>						
2	Poor	None	Fetch from nearby borehole	Poor	Disposed in surrounding farmlands	Footpath
3	Good	Erratic; petrol fuelled generator	Buy/fetch from nearby borehole 150m from cpd	Good	Disposed in farmland	Footpath
4	Poor	Erratic; petrol fuelled generator	Buy/fetch from nearby borehole 300m from cpd	Poor	Burnt within compound/ pit latrine	Footpath
5	Poor	None	Purchased from water vendors*	Poor	Burnt within compound	Footpath
6	Poor	Erratic	Same as above	Poor	Disposed in surrounding farmland	Footpath
7	Poor	Erratic	From borehole	Poor	Burnt within compound	Footpath
8	Very Good	Use of small petrol fuelled generator	Purchased from water vendors	Very Good	Disposed in surrounding farmland	Footpath
9	Good in flat; poor in other spaces	Erratic; generator	Buy from water vendors / fetch from borehole 500m away	Good in flat; poor in other spaces	Disposed in surrounding farmland	Footpath
10	Good	Erratic; generator	Water vendors / fetch from borehole 300m away	Good	Disposed in surrounding farmland	Footpath
11	Poor	Erratic; generator	Borehole	Adequate	Disposed within cpd. as compost	Footpath
12	Adequate	Erratic; generator	Borehole	Adequate	Disposed in gullied streets	Footpath
13	Good	Erratic; generator	Borehole	Adequate	Disposed within cpd. as compost	Footpath
14	Very Poor	Erratic; generator	Borehole	Poor	Disposed in farmland	Footpath
15	Poor	Generator	Borehole	Poor	Disposed within cpd. as compost	Footpath
16	Poor	Erratic; generator	Borehole	Poor	Disposed within farm as compost	Footpath
17	Poor	Erratic; generator	Borehole	Adequate	Disposed within cpd. as compost	Footpath
18	Poor	Erratic; generator	Borehole	Poor	Dumped in nearby river	Footpath
19	Good	Erratic; generator	Borehole	Adequate	Dumped in gullied street	Footpath
20	Poor	Erratic; generator	Borehole	Adequate	Dumped in nearby river	Footpath
21	Adequate	Erratic; generator	Borehole	Poor	Disposed within cpd. as compost	Footpath
22	Good	Erratic; generator	Borehole	Adequate	Dumped in nearby river	Footpath
23	Poor	Erratic; generator	Borehole	Poor	Communal refuse	Footpath
24	Poor	Erratic	Borehole	Poor	Dumped in nearby stream	Footpath
25	Adequate	Erratic; generator	Borehole	Adequate	Dumped in nearby stream	Footpath
26	Poor	Erratic; generator	Borehole/tap (very erratic)	Poor	Disposed within cpd. as compost	Footpath
27	Adequate	Erratic;	Borehole /well	Adequate	Dumped in nearby	Footpath

		generator			gully	
28	Poor	Erratic	Borehole	Poor	Disposed within cpd. as compost	Footpath
29	Poor	Erratic	Borehole	Poor	Disposed within cpd. as compost	Footpath
30	Poor	Erratic	Borehole	Poor	Communal refuse	Footpath
31	Very Poor	None	Fetch from borehole 1km away	Poor	Disposed in surrounding farmland	Footpath
32	Poor	None	Fetch from borehole 1½km	Poor	Disposed in surrounding farmland	Footpath
33	Very Poor	None	Fetch from borehole 1½km away	Poor	Disposed in surrounding farmland	Footpath
34	Very Poor	None	Fetch from borehole 1½km away	Poor	Disposed in surrounding farmland	Footpath
<i>3rd typology</i>						
35	Poor	None	From borehole 2km away	Poor	Disposed in surrounding farmland	Footpath
36	Good	Generator	Borehole	Adequate	Disposed within cpd. as compost	Footpath
37	Poor	None	Borehole	Poor	Disposed in surrounding farmland	Footpath
38	Very Poor	None	Borehole /well	Poor	Disposed in surrounding farmland	Footpath
39	Poor	Erratic	Borehole /well	Poor	Disposed in surrounding farmland	Footpath
40	Poor	Erratic	Borehole /well	Poor	Disposed in surrounding farmland	Footpath
<i>4th typology</i>						
41	Poor	None	Borehole /well	Poor	Disposed in surrounding farmland	Footpath
42	Poor	None	Borehole /well	Poor	Disposed in surrounding farmland	Footpath
43	Poor	None	Well	Poor	Disposed in surrounding farmland	Footpath
44	Poor	None	Well	Poor	Disposed in surrounding farmland	Footpath
45	Poor	None	Well	Poor	Disposed in surrounding farmland	Footpath

S/No	Hospital/ Health care facility	TV	Phone/ mobile	Internet use	Market(s) Frequented
<i>1st typology</i>					
1	Ladkwiwa Medical Center, LMC	Yes	Yes	None	Kantoma, KM
<i>2nd typology</i>					
2	LMC	No	No	None	Tangale Market, TM
3	General Hospital Billiri, GHB	Yes	Yes	None	KM
4	LMC; Yambu Dok Clinic, YDC	Yes	Yes	None	TM, KM
5	LMC	Yes	Yes	None	TM
6	LMC, GHB	No	No	None	TM
7	LMC	No	Yes	None	TM, petty shops, PS
8	LMC	Yes	Yes	None	TM, PS
9	LMC, GHB	Yes	Yes	None	TM, PS
10	Primary Health Clinic, PHC	Yes	Yes	None	TM, PS
11	Lafiya clinic	Yes	Yes	None	TM, KM
12	LMC, GHB	Yes	Yes	None	TM, KM
13	LMC	Yes	Yes	Yes	TM, KM
14	LMC, GHB	Yes	Yes	None	TM
15	LMC, GHB	No	Yes	None	KM
16	LMC	Yes	Yes	None	TM
17	GHB	Yes	Yes	None	TM, KM
18	LMC	Yes	Yes	None	TM, KM
19	LMC, GHB, Lafiya Clinic	Yes	Yes	None	KM
20	LMC	Yes	Yes	None	TM, KM
21	LMC	Yes	Yes	None	TM, KM
22	LMC, GHB	Yes	Yes	Yes	TM
23	LMC, GHB	Yes	Yes	None	TM
24	LMC, GHB	No	Yes	None	TM
25	LMC, GHB	Yes	Yes	None	TM
26	LMC, GHB	Yes	Yes	None	TM
27	LMC, GHB	No	Yes	None	TM
28	LMC, GHB	Yes	Yes	None	TM
29	GHB	No	Yes	None	TM
30	GHB	No	Yes	None	TM
31	PHC	No	Yes	None	TM, PS
32	PHC	Yes	Yes	None	TM, PS
33	PHC	No	No	None	TM, PS
34	PHC	No	Yes	None	TM, PS
<i>3rd typology</i>					
35	PHC	No	No	None	TM, PS
36	GHB	Yes	Yes	None	PS, TM
37	GHB	No	No	None	PS, TM
38	GHB	No	Yes	None	PS, TM
39	LMC	No	No	None	PS, TM
40	LMC	Yes	Yes	None	PS, TM
<i>4th typology</i>					
41	GHB	No	No	None	PS, TM
42	LMC	No	Yes	None	PS, TM
43	GH Kumo	No	Yes	None	PS, Kumo Thursday Market
44	LMC, GHB	No	Yes	None	PS, TM
45	LMC	No	Yes	None	PS, TM

REFERENCES

- Abutu, A. (2012) *Agriculture-North's most potent tool for poverty eradication*. Daily Trust [Online]. Available from: www.dailytrust.com.ng/article_164155. [Accessed 04/06/2012].
- Adebowale, Y. and Ogbu, A. (2012) *Sanusi links Boko Haram to derivation*. Thisday [Online]. Available from: www.thisdaylive.com/articles/sanusi-links-boko-haram-to-derivation/108039. [Accessed 09/05/2012].
- Adejumo, A. (2009) *Social Housing in Nigeria: An eminent Mass Housing Revolution?* [Online]. Available from: www.chatafrikarticles.com/pages/NaijaNewsandReports.html. [Accessed 26/01/09].
- Adelberger, J. (2009) *Maxims and mountaineers-the colonial subjugation of the peoples of the Muri mountains and the adjacent regions of Northern Nigeria 1*. [Online]. Available from: www.afrikanistile-online.de/archiv/2009/1910. [Accessed 11/05/2012].
- Ademiluyi, I. A. (2010) Public housing delivery strategies in Nigeria: A historical perspective of policies and programmes. In: *Journal of Sustainable Development in Africa*. Vol. 12, No. 6, pp. 153-161.
- Aduwo, E. B. (2011) *Housing transformation and its impact on neighbourhoods in selected low-income public housing estates in Lagos, Nigeria*. Unpublished thesis (PhD), Covenant University, Ota.
- Ahmad, R. W. (2012) *ECOWAS ministers meet to discuss region's food crisis*. Daily Trust [Online]. Available from: www.dailytrust.com.ng/article_1642487. [Accessed 05/06/2012].
- Ahmed, M. D. (2007) *Patterns of change in Hausa domestic architecture: A Comparative Study of Selected Contemporary Houses with Traditional Compounds in the Walled City of Zaria*. Unpublished thesis (PhD), Ahmadu Bello University, Zaria.
- Amuga, K. E. (2003) *Tangale and its land, yesterday, today and tomorrow*. Speech presented at the 1st Tangale day celebration, organized by the Tangale Community Development Association, Abuja branch on 6th Dec, 2003, pp. 1-4.
- Ankrumah, N. H. S. (2002) History of the Tangale people. *The Nigerian Messenger*. Jos: Kanthali Enterprises Ltd.
- Arimah, B. (1999) User modifications in public housing estates: some findings from the Nigerian scene. In: A. A. Watona (ed.), *Housing Provision and Bottom-up Approaches: Family Case Studies from Africa, Asia and South America*. Aldershot: Ashgate, pp. 39-54.
- Asquith, L. and Vellinga, M. (2006) Introduction. In: Asquith, L. and Vellinga, M. (eds.). *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 1-22.

- Asquith, L. (2006a) Lessons from the vernacular: Integrated approaches and new research methods for housing research. In: Asquith, L. and Vellinga, M. (Eds.) *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 128-144.
- Asquith, L. (2006b) *Evaluating and Illustrating Domestic Space Use: Collecting and Analysing Behavioural Data for Space Syntax Analysis*. Workshop on Space Syntax and Spatial Cognition held at Spatial Cognition 2006, 24-28th Sept. 2006, Germany, pp. 1-13.
- Attah, A. B. (2004) *The Tangale Nation in Billiri LGA of Gombe State*. Gombe: Jamil Press Ltd.
- Asiyanbola, R. A. (2012a) Psychological well being, urban household crowding and gender in developing countries. In: *Developing Country Studies*, Vol. 2, No. 11, pp. 127-134.
- Asiyanbola, R. A. (2012b) Local perspective, aspiration and women empowerment in housing development in Africa: Nigeria. In: *Journal of Humanities and Social Sciences*, Vol. 5, Issue 4, pp. 15-22.
- Asiyanbola, R. A. (2013) Urban housing experience and gender: An empirical study in Ibadan, Nigeria. In: *Journal of Geography and Geology*, Vol. 5, No. 1, pp. 45-57.
- Audu, I. (1984) *Kibaku Traditional dwelling, Borno State*. Unpublished research paper. Ahmadu Bello University, Zaria.
- Awom, U. (2012) *When sages dissected Nigeria's troubled journey*. Leadership Newspapers [Online]. Available from: www.leadership.ng/ng/articles/23847/2012/05/06. [Accessed 06/05/2012].
- Ayeyemi, D. (2012) Minister tasks FMBN on Social housing. *National Mirror*, 2nd Jan, p. A4 22.
- Bafna, S. (2001) Geometrical intuitions of genotypes. In: *Proceedings of the 3rd International Space Syntax Symposium, 7-11th May, 2001*. Atlanta: A. Alfred Taubman College of Architecture and Urban Planning, University of Michigan, pp. 20.1-16.
- Bafna, S. (2003) Space syntax, a brief introduction to its logic and analytical techniques. In: *Environment and Behaviour*, Vol.35, pp. 17-29.
- Bambranut (2011) [Online image]. Available from: http://en.wikipedia.org/wiki/File:Bambara_nut_unearthed.JPG. [Accessed 26/02/2011].
- Batty, M. (2004) A new theory of Space Syntax. [Online article]. Available from: <http://www.casa.ucl.ac.uk/publications>. [Accessed 19/05/2011].
- Beans (2011) [Online image]. Available from: <http://www.google.co.uk/imgres?imgurl=http://1.bp.blogspot.com>. [Accessed 26/02/2011].

- Benech, C. (2007) New Approach to the study of city planning and domestic dwellings in the Ancient Near East. In: *Archaeological Prospection* 14, pp. 87-103.
- Beniseed (2011) [Online image]. Available from: http://s6photos.tradeholding.com/attach/hash120/157816/sesame_seeds.jpg. [Accessed 24/02/2011].
- Bryman, A. (2012) *Social research methods* (4th ed.). New York: Oxford University Press.
- Chanson, H. (2004) A study of the Marib dam and its sluice system (115 BC -575 AD). In: *Hydraulics of Open Channel flow: An introduction to basic principles, sediment motion, hydraulic modelling, design of hydraulic structures* (2nd Ed), pp. 533-540.
- Chokor, B. A. (2005) Changing urban housing form and organization in Nigeria: Lessons for community planning. In: *Planning Perspectives* 20:1, pp. 69-96.
- Cil, E. (2007) Space, practice, memory: the transformations of the houses in Kula, a town in Anatolia. In: *Proceedings of the 6th International Space Syntax Symposium, 12-15th June, 2007*. Istanbul: ITU, Faculty of Architecture, pp. 060.1-15.
- Conroy Dalton, R. and Kirsan, C. (2008) Small graph matching and building genotypes. In: *Environment and Planning B*, Vol. 35, pp. 810-830.
- Crabtree, A. and Hemmings, T. (2001) The sociality of domestic environments, IRC-ESPRC project. Nottingham: Equator
- Dada, F. O. A, Jibrin, M. G. and Ijeoma, A. (eds.) (2006) *Macmillian Nigeria Secondary Atlas*. Ibadan: Macmillian Publishers Limited.
- Daldy (1945) *Temporary buildings in Northern Nigeria*. Paper No. 10, Lagos: Government Printer.
- Davies, I. (2006) Sheltering from extreme hazards. In: Asquith, L. and Vellinga, M. (eds.). *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 145-154.
- Dawson, P. C. (2002) Space syntax analysis of Central Inuit snow houses. In: *Journal of Anthropological Archaeology*, Vol. 21, pp. 464-480.
- Dawson, P. C. (2003) Examining the impact of Euro-Canadian architecture on Inuit families living in Arctic Canada. In: *Proceedings of the 4th International Space Syntax Symposium, 17-19th June, 2003*. London: Space Syntax Network, pp. 21.1-19
- Dawson, P. C. (2008) Unfriendly Architecture: Using Observations of Inuit Spatial Behavior to Design Culturally Sustaining Houses in Arctic Canada. In: *Housing Studies*, Vol. 23 No. 1, pp. 111-128.

- Dayaratne, R. (2008) Vernacular in transition: the traditional and the hybrid architecture of Bahrain. In: *Proceedings of the 4th International Seminar on Vernacular Settlements*, 14th-17th February, 2008. Ahmedabad: Faculty of Architecture, CEPT University, pp. 1-10.
- Denyer, S. (1978) *African Traditional Architecture*. London: Heinemann Educational Books.
- Desai, M. and Desai, M. (2011) The colonial bungalow in India. In: *The Newsletter* No. 57, Summer 2011, pp. 26-27.
- Diang'a, S. and Hayangah, R. (2011) Redirecting housing transformation and displacement towards sustainable housing delivery: the case of Nairobi, Kenya. In: *N-AERUS XII, 20th-22nd October 2011*. Madrid: Escuela Technica Superior De Arquitectura, pp. 1-20.
- Dmowchoski, Z. R. (1988) *The work of Z. R. Dmowchoski: Nigerian Traditional Architecture*. Moughtin, J. C. (ed.) London: Ethnographica.
- Dmowchoski, Z. R. (1990) *An Introduction to Nigerian Traditional Architecture. Vol.1-3*. Lagos: Ethnographica and National Commission for Museums and Monuments.
- Dumreicher, H. (2008). Chinese villages and their sustainable future: The European Union-China-Research-Project, SUCCESS. In: *Journal of Environmental Management* 87, pp. 204-215.
- Dursun, P. (2007). Space syntax in Architectural design. In: *Proceedings of the 6th International Space Syntax Symposium, 12-15th June, 2007*. Istanbul: ITU, Faculty of Architecture, pp. 56.1-12.
- Ethnofoor (2011) *Call for papers, Ethnofoor anthropological journal* [Online material]. Available from: www.jiscmail.ac.uk/cgi-bin/webadmin. [Accessed 23/06/13].
- Emma-Ochu, C. A. (2009) Adapting architecture schools' curriculum in Nigeria towards global competitiveness. In: *Journal of the Association of Architectural Educators AARCCHES*, Vol. 8, No. 1, pp. 2-7.
- Emery, D. (2011) *Definition of Anthropology*. [Online article]. Available from: www.urbanlegends.about.com/od/glossary/g/anthropology.htm. [Accessed 17/05/2011].
- Esber, G. S. (1987) Designing Apache homes with apaches. In: Wulff and Fiske (eds.), *Anthropological Praxis: Translating Knowledge into Action*. Boulder: Westview Press, pp. 187-196.
- Esber, G. (1977) *The study of space in advocacy, planning with the Tonto Apaches of Payson, Arizona*. Unpublished thesis (PhD), University of Michigan.

- Eyam-Ozung, P. (2012) *Sanusi's Boko Haram economics theory*. Businessday [Online]. Available from: www.businessdayonline.com/NG/index.php/analysis/columnists/32447-sanusi-boko-haram-economics-theory. [Accessed 09/05/2012].
- Eyong, S. O. (1990) Book review-Traditional housing in African Cities: A comparative study of houses in Zaria, Ibadan and Marrakech by F. W. Schwerdtfeger. New York: John Wiley and Sons. In: *Africa, Journal of the International African Institute*, Vol. 60 No. 2, pp. 304-306.
- FGN (2006) *National Housing Policy*. Abuja: Federal Ministry of Works, Housing and Urban Development.
- FGN (2009) *National and State population and housing priority tables (Vol. 1)*. Abuja: National Population Commission. Pop-p 1 table DS1: Distribution of population by State.
- Fien, J., Charlesworth, E., Lee, G., Morris, D., Baker, D. and Grice, T. (2008) A new design framework for remote indigenous housing. In: *AHURI Research and Policy bulletin*, Issue 101, May 2008, pp. 1-3.
- Fisher, K. D. (2009) Placing social interaction: An integrative approach to analyzing past built environments. In: *Journal of Anthropological Archaeology*, Vol. 28, pp. 439-457.
- Folaranmi, A. O. (2010) Post-constructional changes in housing units in mass housing estates in Niger State: A case for housing customization. In: *Proceedings of Architects' Colloquium: The Architecture Forum. Architecture and the National Development Agenda III (April 2010)*. Lagos: ARCON, pp. 35-47.
- Foster, N. (1997) Cities and urban life: London and elsewhere. In: *Structural Engineer*, 4/1997, 75:88, pp. 125-132.
- Foyle (1951) Merchant house in Kofar Mata Street Kano. *Nigeria Magazine*, pp. 21-35.
- Frampton, K. (2002) Towards a critical regionalism: six points for an architecture of resistance. In: *Labour, work and architecture, collected essays on architecture and design*. London: Phaidon
- Funari, P. A. and Zarankin, A. (2003) Social archaeology of housing from a Latin American perspective: A case study. In: *Journal of Social Archaeology*, Vol. 3 (1), pp. 23-45.
- Groundnut (2011) *Organic India* [Online image]. Available from: http://www.organicindia.com/PR_OF_groundnut.php. [Accessed 24/01/2011].
- Gwani, U. S. (1999) *Administrative systems in Tangale Kingdom before and since colonial rule in Nigeria. Vol. 1*. Maiduguri: University of Maiduguri Press.

- Gwani, U. S. (2003) *Tangale Traditional Institutional problems-are the elite to be blamed?* Speech presented at the 1st Tangale day celebration, organized by the Tangale Community Development Association, Abuja Branch on 6th December, 2003, pp. 1-10.
- Hall, E. T. (1963) A system for the notation of Proxemic behaviour. In: *American Anthropologist*, Vol. 65 No. 5, pp. 1003-1012.
- Hall, J. S. (1944) *From cannibalism to Christ: A story of the transforming power of the gospel in darkest Africa*. Toronto: Evangelical Publishers.
- Hanks, L. H. and Brown, C. (2012) Found Places: Approach to Architectural Legacy. In: *Proceedings of Designing Place, International Urban Design Conference, 2nd-3rd April, 2012*. Nottingham: Department of Architecture and the Built Environment, University of Nottingham, pp. 217-232.
- Hanson, J. (1998) *Decoding homes and houses*. Cambridge: Cambridge University Press.
- Hausa Cultural Orientation (2007) *Defense Language Institute Foreign Language Centre* [Online]. Available from: www.famdliflc.lingnet.org. [Accessed 01/03/2011].
- Herskovits, J. (2012) In Nigeria, Boko Haram is not the problem. *New York Times*, 2nd Jan. Available from: www.nytimes.com/2012/01/02/opinion/in-nigeria-boko-haram-is-not-the-problem.html. [Accessed on 31/05/2012].
- Hillier, B. and Hanson, J. (1984) *The Social logic of Space*. Cambridge: Cambridge University Press.
- Hillier, B. (1989) The Architecture of urban objects. In: *Ekistics*, 56 (334/335), pp. 5-21.
- Hillier, B. (1993) Specifically Architectural Theory: A partial account of the ascent from building as cultural transmission to Architecture as Theoretical concretion. In: *The Harvard Architectural Review*, Vol. 9, pp. 9-27.
- Hillier, B. (1997) Cities as movement economies. In: *Intelligent Environments: Spatial aspects of the information revolution*. Droege (ed.). Amsterdam: Elsevier, pp. 295-342.
- Hillier, B. (1998) A note on the intuiting of form: 3 issues in the theory of design. In: *Environment and Planning B: Planning and Design Anniversary Issue*, pp. 27-40.
- Hillier, B. (2005) The art of place and the science of space. In: *World Architecture 11/2005 185*. Special Issue on Space syntax (English), pp. 1-32.
- Hillier, B. (2007) *Space is the Machine: A configurational theory of Architecture* Space Syntax: Press Syndicate.

- Hillier, B., Hanson, J. and Graham, H. (1987) Ideas are in things: An application of the space syntax method to discovering house genotypes. In: *Environment and Planning B: Planning and Design*, 1987, Vol. 14, pp. 363-385.
- Hillier, B., Penn, A., Hanson, J., Grajewski, T. and Xu, J. (1993) Natural movement or configuration and attraction in urban pedestrian movement. In: *Environment and Planning B: Planning and Design*, Vol. 20, pp. 27-40.
- Hunter, S. S. (2010) *Space Syntax*. [Online]. Available from: www.udeworld.com/104-space-syntax.html. [Accessed 28/10/2010].
- Ibem, E. O. and Amole, O. O. (2010) Evaluation of Public housing programmes in Nigeria: A theoretical and conceptual approach. In: *The Built and Human Environment Review*, Vol. 3, pp. 88-117.
- Ibem, E. O. (2010) An assessment of the role of Government agencies in Public Private Partnerships in housing delivery in Nigeria. In: *Journal of Construction in Developing Countries*, Vol. 15(2), pp. 23-48.
- Ikebude, C. (2009) *Identity in Igbo Architecture-Ekwuru, Obi and the African Continental Bank Building*. Unpublished thesis (M.A.), University of Ohio.
- Jacobs, J. (2003) *African Architecture in transit: Tents and Textiles*. Review of lecture slides by Labelle Prussin, Goethe Room, The California Academy of Science, Golden Gate Park, San Francisco. April 23rd, 2003. Available from: www.friendsofethnart.org/labelle_prussin_review. [Accessed 02/05/2011].
- Jeong, S. K. and Ban, Y. U. (2011a) Computational algorithms to evaluate design solutions using space syntax. In: *Computer-Aided Design*, Vol. 43, pp. 664-676.
- Jeong, S. K. and Ban, Y. U. (2011b, in press) Developing a topographical information extraction model for space syntax analysis. In: *Building and Environment* [doi: 1016/j.buildenv.2011.05.024]. pp. 1-12.
- Jinadu, A. M. (2007) *Understanding the Basics of Housing: A book of study notes for students in tertiary institutions*. Jos: Jos University Press, pp. 48-76.
- Kabir, B. and Bustani, S. A. (2009) *A review of housing delivery efforts in Nigeria*. [Online article]. Available from: <http://www.gla.ac.uk/media/media129767en.pdf> [Accessed 14/07/2011].
- Kabir, G. U. (2009) *Transformation in Hausa traditional residential architecture (1900-2005)*. Unpublished thesis (PhD), Ahmadu Bello University, Zaria.
- Kajo, T. (2012) *FG urged to professionalize agricultural sector*. [Online]. Available from: www.dailytrust.com.ng/article_164248. [Accessed 05/06/2012].
- Kellet, P. (2009) Advocacy in anthropology: Active engagement or passive scholarship? In: *Durham Anthropology Journal*, Vol. 16(1), pp. 22-31.

- Kemeny, J. (1987) Toward a theorized housing studies: A counter-critique of the provision thesis. In: *Housing Studies*, Vol. 2 No. 4, pp. 249-260.
- Kent, S. (1990) Activity areas and architecture: An interdisciplinary view of the relationship between use of space and domestic built environments. In: *Domestic architecture and the use of space: An interdisciplinary cross-cultural study*. Kent (ed.). Cambridge: Cambridge University Press, pp. 1-8.
- Koch, D. (2010) Architecture Re-configured. In: *The Journal of Space Syntax*, Vol. 1 Issue 1, pp. 1-16.
- Kotharkar, R. & Deshpande, R. (2012) A comparative study of transformations in traditional house form: the case of Nagpur region, India. In: *Journal of the International Society for the study of Vernacular Settlements*, Vol. 2 No. 2, pp. 17-33.
- Kuper, H. (1972) The Language of sites, the politics of space. In: *American Anthropologist*, Vol. 74, pp. 411-425.
- Kure, S. (1987) *Teach yourself the Tangale language*. Jos: Challenge Press.
- Kus, S. and Raharijaona, V. (1990) Domestic space and the tenacity of tradition among some Betsileo of Madagascar. In: *Domestic architecture and the use of space: An interdisciplinary cross-cultural study*. Kent (ed.). Cambridge: Cambridge University Press, pp. 21-33.
- Kwada, B. D. (1987) *Rehabilitation-cum-Resettlement of the Kamwe, Gongola State*. Unpublished research paper. Zaria: Department of Architecture, Ahmadu Bello University.
- Kwararafa (2008) [Online image]. Accessed from: <http://en.wikipedia.org/wiki/File:Kwararafa.jpeg>. [Accessed 20/02/2011].
- Labarun Hausawa da Makwabtansu (1979) Littafi na Biyu, Vol. II. Zaria: The Northern Nigeria Publishing Company.
- Latter, R. (2006) Educating architects to become culturally aware. In Asquith, L. and Vellinga, M. (eds.) *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 245-261.
- Law, G. (2011) *Area of Nigeria*. Available from: www.statoids.com/ung.html. [Accessed 15/05/2012].
- Lawrence, D. L. and Low, S. M. (1990) The built environment and spatial form. In: *Annual Review of Anthropology*, Vol. 19, pp. 453-505.
- Lawrence, R. J. (1990) Public collective and private space: A study of urban housing in Switzerland. In: *Domestic architecture and the use of space: An interdisciplinary cross-cultural study*. Kent (ed.). Cambridge: Cambridge University Press, pp. 73-91.

- Lawrence, R. J. (2006) Learning from the vernacular: Basic principles for sustaining human habitats. In: Asquith, L. and Vellinga, M. (eds.) *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 110-127.
- Leach, E. (1978) Does space syntax really "constitute the social"? Social Organization and Settlement: contributions from Archaeology. In: *Archaeology and Geography*. Green, Haselgrove and Spriggs (eds.). British Archaeological Reports, International Series (47), pp. 385-401.
- Lendering, J. (2011) *Ancient Arabia: Arabia Felix*. [Online] Available from: <http://www.livius.org/ap-ark/arabia/arabia.html>. [Accessed 20/02/2011].
- Lynch, K. (1960) *Image of the City*. Cambridge: MIT Press.
- Lwamayanga, C. (2008) Constancy and change: the living process and skills in vernacular architecture of Kagera region, Tanzania. Published dissertation (Ph.D). Oslo: The Oslo School of Architecture and Design.
- Mabogunje (1968) *Urbanization in Nigeria*. London: Oxford University Press.
- Mai, M. M. and Rahman, M. (2010) Cultural sustainability: Contrasting Housing transformation patterns of peri-urban Abuja and core Dhaka settlements. *12th New Housing Researcher's Colloquium, 2-3rd July, 2010*. Istanbul: NHR, pp. 1-20.
- Mai, M. M. and Shamsuddin, S. (2008) Ethnic spatial identity in the context of urbanization: the transformation of Gbagyi compounds in North Central Nigeria. In: *Journal of Urbanism: International research on Placemaking and Urban sustainability*, Vol.1 No. 3, pp. 265-280.
- Mai, M. M. and Shamsuddin, S. (2007) *Urbanization and globalization of Gbagyi housing transformation* [Online]. Available from: www.psasir.upm.edu.my/2451/1/7-Mai.pdf, pp. 49-58. [Accessed 16/02/2011].
- Maikenti, O. S. (n.d.) *The brief history of the development of Billiri ECWA Theological Seminary BETS*, pp. 1-5.
- Maina, J. (2002) The Tangale community in the 21st Century. *The Nigeria Messenger*. 30th April, 2002. Jos: Kanthali Enterprises Ltd p 22-23.
- Maina, J. J. (2009) Determinants of House form and Residential structure in Tangale land, Gombe State-Nigeria. In: *ARCHISEARCH Journal*, Vol. 1 No 1, pp. 73-83.
- Maina, J. J. (2012a) Framework for the study of socio-cultural factors in Architectural and Urban studies of traditional communities in Nigeria. In: *Proceedings of Designing Place, International Urban Design Conference, 2nd-3rd April, 2012*. Nottingham: Department of Architecture and the Built Environment, University of Nottingham, pp. 368-371.

- Maina, J. J. (2012b) Transformation of traditional community housing in contemporary times: A case study of Tangale land, North-Eastern Nigeria. Paper presented at the 9th AHRA Research Students' Conference *Emerging boundaries of Research Principles & Praxis*, 19th-20th May, 2012. Scott Sutherland School of Architecture, Robert Gordon University, Aberdeen, UK, pp. 1-15.
- Maina, J. J. (2012c). Using Space Syntax methods to explore abandoned prototype housing units in Tangale land, North Eastern Nigeria. In: *Journal of Space Syntax*, Vol. 3 No. 2, pp. 223-227.
- Maina, J. J. (2013a) Uncomfortable prototypes: rethinking socio-cultural factors for the design of public housing in Billiri, North East Nigeria. In: *Frontiers of Architectural Research*, Elsevier. Available from: <http://dx.doi.org/10.1016/j.foar.2013.04.004>
- Maina, J. J. (in press) Constants amidst change: socio-cultural factors influencing house form and residential structure in Tangale land, northeast Nigeria. *Journal of the International Society of Vernacular Settlements, ISVS*
- Maina, J. J., Stacey, M. and Samant, S. (2013) Conformity vs Resistance: the changing and constant facets of Tangale domestic architecture, NE Nigeria. Poster presentation prepared for the East Midlands Universities Postgraduate Research Conference, 6th September 2013, University of Derby, UK.
- Marchand, T. H. J. (1993) *Gidan Hausa*. Montreal: Que.
- Marchand, T. H. J. (2009) *The masons of Djenne*. Bloomington-Indianapolis: Indiana University Press.
- Marcus, L. (2002) The need for theoretical knowledge in architectural practice. In: *Nordic Journal of Architectural Research*, Vol. 15 No. 4, pp. 1-20.
- Marcus, L. (2010) Spatial capital: A proposal for an extension of space syntax into a more general urban morphology. In: *Journal of Space Syntax*, Vol. 1 Issue 1, pp. 30-40.
- Marib Dam (2011) [Online article] Available from: http://en.wikipedia.org/wiki/Ma'rib_Dam. [Accessed 20/02/2011].
- Matazu, G. S. (2008) "We'll monitor how FHA spends its funds". Daily Trust [Online edition of Sunday, 28th Dec.] Available from: <http://www.dailytrust.com>. [Accessed 26/01/09].
- Mbina, A. A. (1999) *European influence on Traditional house form in Old Calabar and its Environs (Efik land) 1800-1960*. Unpublished thesis (PhD), Ahmadu Bello University, Zaria.
- Mela, V. (2004) *Understanding the Tangale language*. Jos: Opium Productions.
- Microsoft Encarta (2009). *Sociology*. Redmond, WA: Microsoft Corporation.

- Mirmoghtadaee, M. (2009) Process of housing transformation in Iran. In: *Journal of Construction in Developing Countries*, Vol. 14 No. 1, pp. 69-80.
- Moughtin, J. C. (1988a) Foreword. In: *The work of Z. R. Dmowchoski: Nigerian Traditional Architecture*. Moughtin, J. C. (ed.) London: Ethnographica, pp. 5-6.
- Moughtin, J. C. (1988b) *The work of Z. R. Dmowchoski: Nigerian Traditional Architecture (An edited version of the paper presented at the International Symposium Traditional Dwellings and Settlements in a comparative perspective, University of California, Berkeley, USA, April 1988)*. Moughtin, J. C. (ed.) London: Ethnographica, pp. 56-76.
- Muhammad Oumar, A. A. (1997) *Gidaje-the socio cultural morphology of Hausa living spaces*. Unpublished thesis (PhD), University College London.
- Mulekamugani (2010) *Brief history of the Tangale people of Tangale Chieftdom* [Online]. Available from: www.blogspot.com/.../brief-history-of-tangale. [Accessed 24/10/2010].
- Mustafa, F. A., Hassan, A. S. and Baper, S. Y. (2010) Using space syntax analysis in detecting privacy: A comparative study of traditional and modern house layouts in Erbil city, Iraq. In: *Asian Social Science*, Vol. 6 No. 8, pp. 157-166.
- National Archives (1944) *Future provision for colonial development and welfare* (Cabinet papers of the British Government) [Online]. Available from: www.filestore.nationalarchives.gov.uk/pdfs/small/cab-66-57-wp-44-643-43.pdf [Accessed 01/11/2012].
- Ndubueze, O. J. (2009) *Urban housing affordability and housing policy dilemmas in Nigeria*. Unpublished thesis (PhD), University of Birmingham.
- Nelson, M. R. (2010) *Introduction to Quantitative Research workbook*. University of Nottingham Graduate school (GSTRM4), pp. 27-57, 76-77.
- Nigerian Civil War (2013) *Nigerian_Civil_War* [Online article]. Available from: en.wikipedia.org/wiki/Nigerian_Civil_War [Accessed 07/06/2013].
- Norberg-Schulz, C. (1974) *Existence, Space and Architecture*. New York: Praeger.
- NPC (2006a) *Census Priority tables (LGA) Vol. II*. Abuja: National Population Commission.
- NPC (2006b) *Official gazette FGP 71/52007/2, 500(OL24), legal notice on publication of details of the breakdown of the National and State Provincial totals 2006 Census*. Available from: www.nigerianstat.gov.ng. [Accessed 08/03/2011].
- O'Neill, P. (2008) The role of theory in housing research: Partial reflections on the work of Jim Kemeny. In: *Housing, Theory and Society*, Vol. 25 No. 3, pp. 164-176.

- Odeyale, T., Sodagar, B. and Temple, N. (2010) Indigenous cultures, meanings and metaphors in the vernacular building traditions in South West Nigeria. In *Proceedings of the conference, The Cultural role of Architecture, 23rd-25th June, 2010*. Lincoln: EMMTEC, University of Lincoln, pp. 1-18.
- Oliver, P. (ed.) (1997) *Encyclopedia of Vernacular Architecture of the World, Vol I-Theories and Principles*. Cambridge: Cambridge University Press, The Press Syndicate.
- Oliver, P. (2003) *Dwellings: The Vernacular House worldwide*. London: Phaidon Press.
- Oliver, P. (2006a) Afterword: Raising the roof. In: Asquith, L. and Vellinga, M. (eds.) *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 262-268.
- Oliver, P. (2006b) *Built to meet needs: Cultural issues in Vernacular Architecture*. Oxford: Elsevier Architectural Press.
- Olotuah, A. O. and Adesiji, O. S. (2005) Housing poverty, slum formation and deviant behaviour [Online]. In: *Papers and presentations, The Housing Studies Association Conference, University of Lincoln, UK, 8th-9th September, 2005*, pp. 1-12. Available from: www.york.ac.uk/cp/hsa/autumn05/papers/OLOTUAH1.doc. [Accessed on 23/07/12].
- Olotuah, A. O. and Ajenifujah, A. O. (2009) Architectural education and housing provision in Nigeria. In: *CEBE Transactions*, Vol. 6 Issue 1, pp. 86-102.
- Oluyemi, E. O. (1996) *Space and socio cultural transformation: A diachronic study of Yoruba Urban housing and user responses to changes in its spatial organization*. Unpublished thesis (PhD), Georgia Institute of Technology.
- Onibokun, P. (1990). A review of the Nigerian Housing Policy and Programmes. In: Onibokun, P. (ed). *Urban Housing in Nigeria*. Ibadan: Nigerian Institute of Social and Economical Research, NISER, pp. 1-5.
- Onwubiko, E. (2011) *Unemployment is deadlier than bombs* [Online]. Available from: www.thenigerianvoice.com/nvnews/57246. [Accessed 16/05/2012].
- Oriye, O., Owoeye, O. and Weje, I. I. (2012) *Gender equality in housing delivery- a panacea to adequate housing supply in Nigeria*. In: *Journal of Social Sciences*, Vol. 3 (11), pp. 437-445.
- Osasona, C. O. (2007) From Traditional residential architecture to the Vernacular: the Nigerian Experience [Online]. Conference paper presented at the *Africa Architecture Today*, Kwame Nkrumah University of Science and Technology, Kumasi-Ghana. 5th-8th June, 2007. Available from: www.mudonline.org/aat/programme.htm. [Accessed 16/02/2011].
- Osasona, C. O. (2009) *Nigeria's Popular Architecture*. [Online]. Available from: http://www.archiafrika.org/files/AA%20newsletter_July09_ENG.pdf. [Accessed 17/02/2011].

- Osman, K. M. and Suliman, M. (1994) The Space Syntax methodology: Fits and Misfits. In: *Arch. & Comport./ Arch. & Behav.*, Vol. 10 No. 2, pp. 189-204.
- Osman, K. M. and Suliman, M. M. (2005) Continuity and changes in the morphology of Urban Sudanese Homes. In: *Proceedings of the XXXIII IAHS World Congress on Housing: Transforming Housing Environment through design, 27-30th September 2005*. Pretoria, South Africa: IAHS, pp. 1-9.
- Osman, K. M. (1993) *Spatial and Aspatial Analysis: A conceptual approach for more informative design decisions*. Unpublished thesis (PhD), University of Florida.
- Ostwald, M. J. (2011) Examining the relationship between typology and geometry: A configurational analysis of the rural houses (1984-2005) of Glenn Murcutt. In: *Journal of Space Syntax*, Vol. 2 Issue 2, pp. 223-246.
- Ozaki, R. and Coolen, H. (2004) Culture, lifestyle and the meaning of a dwelling. In: *Proceedings of the International Conference-Adequate and affordable housing for all: Research, Policy, Practice, 24-27th June, 2004*. Toronto: CUCS Press, pp. 1-15.
- Ozaki, R. and Lewis, J. R. (2006) Boundaries and the meanings of social space: A study of Japanese house plans. In: *Environment and Planning: Society and Space 2006*, Vol. 24, pp 91-104.
- Ozkan, S. (2006). Traditionalism and Vernacular Architecture in the 21st C. In: Asquith, L. and Vellinga, M. (eds.). *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 97-108.
- Pandjaitan, T. H. (2008) Transformation of building form: Development of traditional dwelling of the Ngada, Central Flores Island. In: *Proceedings of the 4th International Seminar on Vernacular Settlements, 14th-17th February, 2008*. Ahmedabad: Faculty of Architecture, CEPT University, pp. 356-364.
- Peponis, J. and Wineman, J. (2002) Spatial structure of Environment and behaviour. In: *Handbook of Environmental Psychology*. Bechtel and Churchman (eds.) New York: John Wiley & Sons, pp. 271-291.
- Plimpton, C. L. and Hassan, F. A. (1987) Social space: a determination of house architecture. In: *Environment and Planning B: Planning and Design* (14), pp. 439-449.
- Popoola, J. O. (1984) *Responsive housing: The spatial formation of the housing environment in Hausaland, Nigeria, and the implication of public housing strategy*. Unpublished thesis (PhD), University of Nottingham.
- PPG (2011) *PPG Design brochure* [Online]. Available from: www.ppgfirst.com. [Accessed 23/07/2011].
- Prucnal-Ogunsote, B. (1993) *A study of Modern trends in some aspects of Nigerian Architecture*. Unpublished thesis (PhD), Ahmadu Bello University, Zaria.

- Prucnal-Ogunsote, B. (2002) Classification of Nigerian Architecture. In: *AARCHES Journal*, Vol. 1 No. 6, pp 1-13.
- Prucnal-Ogunsote, B. (2005) Reflection of Culture and climate in the vernacular and modern architecture of Akure. In: *Proceedings of the International Conference on Science and Technology, 14th -19th August, 2005*. Akure: Federal University of Technology, pp. 1-8.
- Prussin, L. (1968) The Architecture of Islam in West Africa. In: *African Arts*, Vol. 2 No.1 (Winter 1968), pp. 32-74.
- Prussin, L. (1974) An introduction to Indigenous African Architecture. In: *Journal of Architectural Historians*, Vol. 33 No. 3 (Oct. 1974), pp. 182-205.
- Prussin, L. (1986) *Hatumere: Islamic design in West Africa*. Berkeley: University of California Press.
- Prussin, L. (2002) African Nomadic Architecture. In: *Indian Folklife*, Vol.2 Issue 1 (July 2002), pp. 12-13.
- Prussin, L. (2011) 'Convivencia' at Timbuktu: Jewish influence on West African Architecture [Online]. Lecture given at Columbia University, Teacher's College Harace Mann Hall, Room 138, 525 West 120th Street, New York City on the 23rd of March, 2011. Available from: www.archdaily.com/105728/sightlines-new-perspectives-on-african-architecture-and-urbanism on 03/05/2011. [Accessed 02/05/2011].
- Psarra, S. (2009) *Architecture and Narrative*. Abingdon: Routledge.
- Raheem, A. A., Momoh, A. K. and Soyingbe, A. A. (2012) Comparative analysis of sandcrete hollow blocks and laterite interlocking blocks as walling elements. In: *International Journal of Sustainable Construction Engineering and Technology* Vol. 3, Issue 1, pp. 79-88.
- Randal, R. (2007) Western weeds: a guide to the weeds of Western Australia [Online]. In: *PIER Pacific Island Ecosystems at Risk*. Plant protection Society of Western Australia. Available from: <http://www.hear.org/pier/imagepages/singles/coolip67.htm>. [Retrieved 26/02/2011].
- Rapoport, A. (1969) *House form and Culture*. Foundations of Cultural Geography Series. New Jersey: Prentice-Hall.
- Rapoport, A. (1990) System of Activities and system of Settings. In: *Domestic architecture and the use of space: An interdisciplinary cross-cultural study*. Kent (ed). Cambridge: Cambridge University Press, pp. 9-20.
- Rapoport, A. (1998) Using Culture in Housing Design. In: *Housing and Society*, Vol. 25 No. 1 & 2, pp. 1-20.

- Rapoport, A. (2006) Vernacular design as a model system. In: Asquith, L. and Vellinga, M. (eds.), *Vernacular Architecture in the 21st C: Theory, Education and Practice*. Oxon: Taylor and Francis Group, pp. 179-197.
- Rapoport, A. (2007) The Nature of the Courtyard House: A Conceptual Analysis. In: *TDSR*, Vol. XVIII No. II (Special Article), pp. 57-72.
- Ratti, C. (2004a) Urban texture and space syntax: Some inconsistencies. In: *Environment and Planning B: Planning and Design* 2004, Vol. 31, pp. 487-499.
- Ratti, C. (2004b) Rejoinder to Hillier and Penn. In: *Environment and Planning B: Planning and Design* 2004, Vol. 31, pp. 513-516.
- Rikko, L. S. and Gwatau, D. (2011) The Nigerian architecture: the trend in housing development. In: *Journal of Geography and Regional Planning*, Vol. 4 (5) May 2011, pp. 273-278.
- Rittleman, P. R. (2010) *The case for Architectural Research: A personal essay* [Online]. Available from: http://www.burthill.com/FILES/practice/Case_for_Architectural_Research.pdf. [Accessed 23/03/2010].
- Robb, M. H. (2007) The spatial logic of Zacuala, Teotihuacan. In: *Proceedings of the 6th International Space Syntax Symposium, 12-15th June, 2007*. Istanbul: ITU, Faculty of Architecture, pp. 062.1-16.
- Saad H. T. (1985) The role of individual creativity in the traditional African art: the Gwani (genius) amongst master builders of Hausaland. In: *Nigeria Magazine*, Vol. 53 No. 4, pp. 3-16.
- Saad H. T. (1986) Impact of modernization and westernization on traditional Hausa architecture. *Kano Series (New Series)*, Vol. 3 No. 4, pp. 127-151.
- Saad, H. T. (1981) *Between Myth and Reality: The Aesthetics of Architecture in Hausa land*. Unpublished thesis (PhD), University of Michigan.
- Saad, H. T. (1987) Traditional building in Africa and America-four books reviewed. In: *Journal of the Society of Architectural Historians*, Vol. 46 No. 4, pp. 434-437.
- Saad, H. T. (1991) Folk culture and architecture in North Eastern Nigeria. In: *Paideuma*, Vol. 37, pp. 253-289.
- Salama, A. M. and Alshuwaikhat, H. M. (2010) A trans-disciplinary approach for a comprehensive understanding of sustainable affordable housing. In: *GBER, Global Built Environment Review*, Vol. 5 No. 3, pp. 35-50.
- Salama, A. M. (2007) Navigating housing affordability between trans-disciplinarity and life-style theories: The case of the Gulf States. In: *Archnet-IJAR, International Journal of Architectural Research*, Vol. 1 Issue 2, pp. 57-76.

- Salama, R. (1995) *User transformation of Government Housing Projects: Case study, Egypt*. Unpublished thesis (PhD), McGill University.
- Salim, A. (1998) Owner-occupiers transformation of public low cost housing in Peninsular Malaysia. Unpublished thesis (PhD), University of Newcastle.
- Sanders, D. (1990) Behavioral conventions and archeology; methods for the analysis of ancient architecture. In: *Domestic architecture and the use of space: An interdisciplinary cross-cultural study*. Kent (ed). Cambridge: Cambridge University Press, pp. 43-47.
- Schwerdtfeger, F. W. (1982) *Traditional housing in African Cities: A comparative Study of houses in Zaria, Ibadan and Marrakech*. New York: John Wiley and Sons.
- Schwerdtfeger, F. W. (1986) Book review-J. C. Moughtin: Hausa Architecture. London: Ethnographic Arts and Culture series. In: *Africa: Journal of the International African Institute*, Vol. 56 No. 4, pp. 497-499.
- Schwerdtfeger, F. W. (1990) Book review-Labelle Prussin: Hatumere, Islamic design in West Africa. In: *Africa: Journal of the International African Institute* Vol. 60 No. 1, pp. 150-153.
- Science.jrank (2011) *The roots of indigenous African Architecture* [Online article]. Available from: www.science.jrank.org/pages/8352/Architecture-Africa-Roots-Indigenous-African-Architecture.html. [Retrieved 03/05/2011].
- Scott, J. (1990) *A matter of record*. Cambridge: Polity.
- Sheuya, S. A. (2009) Urban poverty and housing transformations in informal settlements: the case of Dar-es-Salaam, Tanzania. In: *IDPR*, 31 (1), pp. 81-108.
- Shiferaw, D. (1998) Self initiated transformation of public-provided dwellings in Addis Ababa, Eithopia. In: *Cities*, Vol. 15, pp. 437-448.
- Smith M. G. (1952) A study of Hausa domestic economy in Northern Zaria. In: *Africa*, Vol. XXII
- Spradley, J. and McCurdy, D. W. (eds.) (2009) *Conformity and conflict: Readings in cultural anthropology* (14th ed). Boston: Pearson.
- Spradley, J. (1979) *The anthropological interview*. Belmont: Wardsworth Cengage
- Steadman, P. (2004) Guest Editorial. In: *Environment and Planning B: Planning and Design*, Vol. 31, pp. 483-486.
- Stegell, C. D., Binder, S. K., Davidson, L. A., Vega, P. R., Hutton, E. D. and Rodecap, A. R. (2001). The role of theory in the study of housing. In: *Housing and Society*, Vol. 28 No. 1 & 2, pp. 87-100.

- Stewart, R. T. (1978) A dam at Marib. In: *Saudi Aramco World*, Vol. 29 No. 2, pp. 24-29.
- Sueca, N. P. (2003) *Housing transformation: Improving environment and developing culture in Bali*. Unpublished thesis (PhD), University of Newcastle upon Tyne.
- Taghlib (2011) In: *Encyclopedia Britannica*. Available from: <http://www.britannica.com/EBchecked/topic/580302/Taghlib>. [Accessed 20/02/2011].
- Tahar, B. (2004) Understanding home cultures through syntactic analysis: the case of Berber Housing. In: *Housing, Theory and Society*, Vol. 21 No. 3, pp. 111-127.
- The Banyun mapping report* (1998) [Online image]. Available from: <http://www.barnard.nl/yemen/map.html>. [Accessed 20/02/2011].
- The Nigerian jihad in historical perspective* (2012) [Online article]. Available from: www.kpr37.newsvine.com [Accessed 28/08/2012].
- Thiel, P. (1970) Notes on the description, scaling, notations and scoring of some perceptual and cognitive attributes of the physical environment. In: *Environmental Psychology*. Proshansky et al (eds.) New York: Holt, Rinehart and Winston, pp. 595-619.
- Tipple, A. G. (1991) *Self help transformations of low cost housing: An Introductory Study*. Newcastle upon Tyne: CARDO in association with the International Urban Press.
- Tipple, A. G. (1999) User initiated transformations of government-built housing stocks: Lessons from developing countries. In: *Journal of Urban Technology*, Vol. 6 No. 3, pp. 17-35.
- Tipple, A. G. and Salim, A. (1999) User-initiated extensions as housing supply: a study of government built low cost housing in Malaysia. In: *Third World Planning Review*, Vol. 21, pp. 119-154.
- Tipple, A. G. (2000) *Extending themselves: User-initiated transformations of government built housing in Developing Countries*. Liverpool: Liverpool University Press.
- Tipple, A. G., Masters, G. A. and Garrod, G. D. (2000) An assessment of the decision to extend government-built houses in Developing Countries. In: *Urban Studies*, Vol. 37, pp. 1605-1617.
- Tree Aid (2008). *A date in the Desert* [Online image]. Available from: <http://www.treeaid.org.uk/page2.asp?pi> [Accessed 26/02/2011].
- Udeh, C. (1990) Balancing the practicalities with behavioural analysis in today's Nigerian Architectural education. In: *Journal of the Association of Architectural Educators AARCCHES*, 1(1), pp. 22-25.

- Uduku, O. (1996) Urban fabric of Igbo architecture in the South Eastern Nigeria in the 1990s. In: *Habitat International*, Vol. 20 No. 2, pp. 191-202.
- Uji, Z. A. (1999) *Informal Self Help Housing in Jos*. Unpublished thesis (PhD), University of Jos.
- Umoru-Oke, N. (2010) Risawe's Palace, Ilesa Nigeria: Traditional Yoruba Architecture as socio cultural and religious symbols. In: *African Research Review*, Vol. 4 No. 3, pp. 247-260.
- UN (2011) *World Economic Situation and Prospects (Advance unedited edition)* [Online]. Available from: www.un.org/en/development/desa/policy/wesp/wesp_archive/2011 [Accessed on 10/05/2012]
- Uroko, C. (2011) *Why investors and developers avoid mass housing*. Business Day [Online]. Tuesday, 15th February, 2011. Available from: www.businessdayonline.com [Accessed 23/07/2011].
- Usman, Y. B. (2004) *The Sokoto Caliphate and Nation building* [Online]. Available from: <http://www.ceddert.com/publications/ceddert013.pdf> [Accessed 28/08/2012].
- Utomi, P. (2012) Nigerian Government a criminal enterprise, *The News: Cover story* 30/04/2012 [Online]. Available from: thenewsafrika.com/2012/04/30 [Accessed 06/05/2012].
- Vellinga, M. (2007) Anthropology and the materiality of culture (Review essay). In: *American Ethnologist* Vol. 34, No. 4 pp. 756-766.
- Vila, X. M., Rotea, R. B. and Borrazas, P. M. (2003) *Archaeotecture: Archaeology of Architecture*. BAR Series 1175 (2003). Oxford: Archaeopress.
- Vitruvius. *The ten books of Architecture*. Translated by M. H. Morgan (1960). Dover
- Vlach, J. M. (1976) Affecting Architecture of the Yoruba. In: *African Arts*, Vol. 10 No. 1, pp. 48-53, 99.
- Wakaye, M. D. (2002). *Tangale Ethnography*. The Nigeria Messenger. 30th April, 2002. Jos: Kanthali Enterprises Ltd.
- Wali (2011) *A history of the Tangale people*. Unpublished handwritten manuscript translated from the Hausa language by the author, February 2011.
- Wallis, W. (2012) Nigerian Central Banker calls for end to imbalances. *Financial Times*, 26/01/2012 [Online]. Available from: www.ft.com/cms/s/0/02ce9e7e-4837-11e1-blb4feabdc0.html. [Accessed 09/05/2012].
- West Tangale Native Authority (1951) Billiri hills forest reserve order. In: *Native Authority public notice*, No. 104 of 1951, p. 1.

Wiki (2012) *Nigeria topography map* [Online image]. Available from:
www.wikipedia.org. [Accessed 25/09/2012].

Zako, R. (2006) The power of the veil: gender inequality in the domestic setting of traditional courtyard houses. In: *Courtyard housing: Past, present & future*. Edwards, B.; Sibley, M.; Hakmi, M. and Land, P. (eds.). Abingdon: Taylor & Francis, pp. 65-75.

<i>Alkhairi, alheri</i>	to bless, accord good will
<i>Asubahi</i>	dawn, very early in the morning
<i>Bandaki</i>	toilet
<i>Biyu</i>	two
<i>Daki</i>	room
<i>Galadima</i>	principal minister
<i>Kambi</i>	crown, sign of authority/royalty
<i>Labari</i>	story (<i>labaru</i> plural)
<i>Litafi</i>	book
<i>Mai Unguwa</i>	head of a ward, division in a town or village
<i>Makwabta</i>	neighbours (<i>makwabci</i> singular)
<i>Musulunci</i>	Islam
<i>Nagode</i>	thank you
<i>Sanya</i>	to grant something
<i>Sarauta</i>	royalty, royal rule/power
<i>Sarki</i>	ruler, king, leader of a town, tribe, people
<i>Tsakar gida</i>	open courtyard
<i>Wanka</i>	to bathe
<i>Zaure</i>	entrance hall, compound head's reception room, visitor's room
<i>Zumunci</i>	good relationship, rapport